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Incorporating Food Industries Weekly

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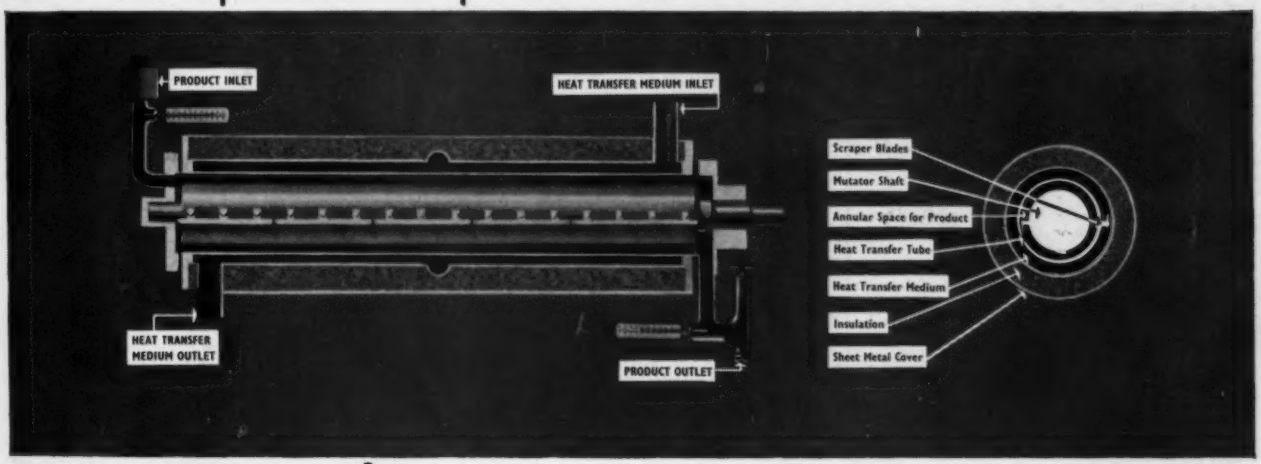

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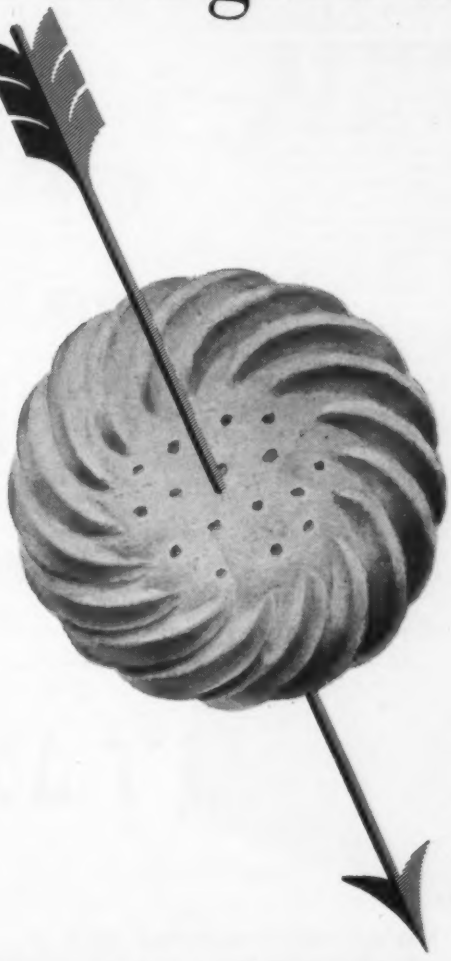

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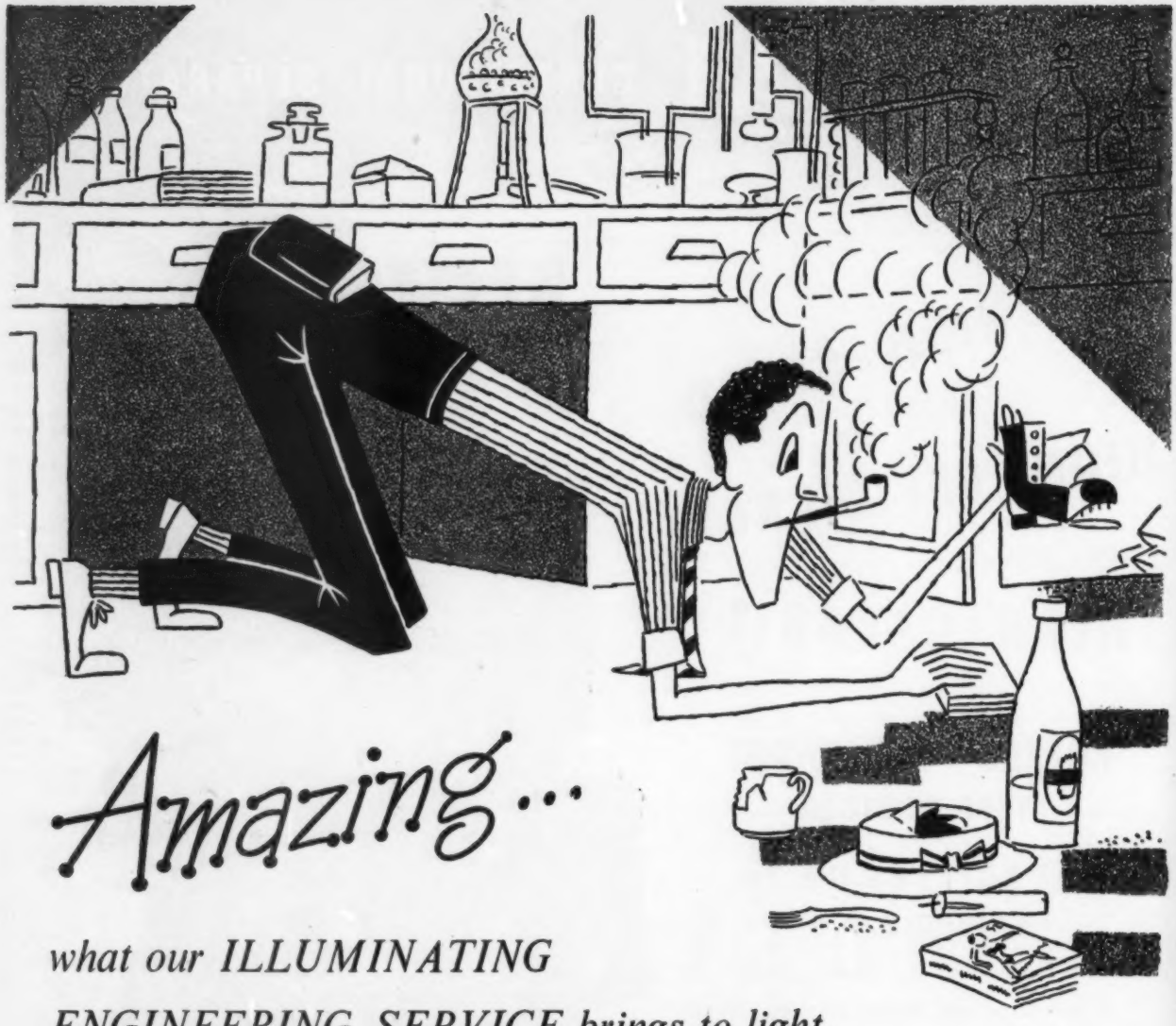

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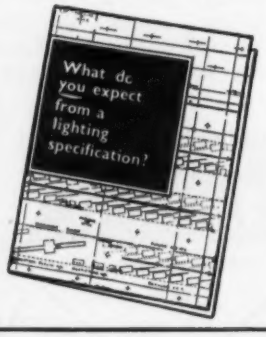

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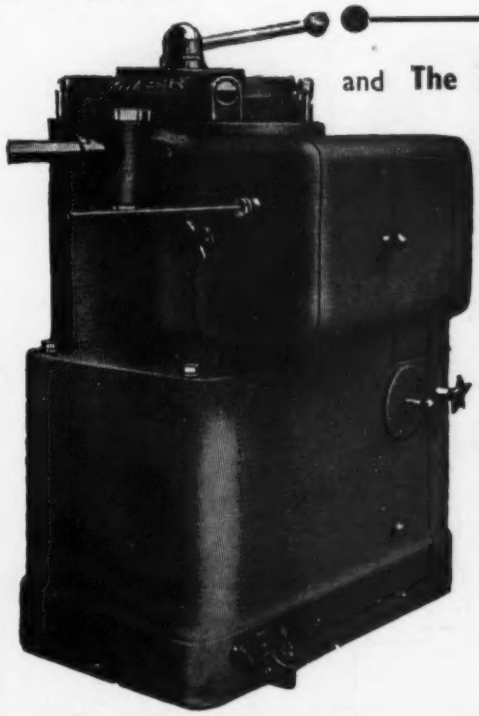

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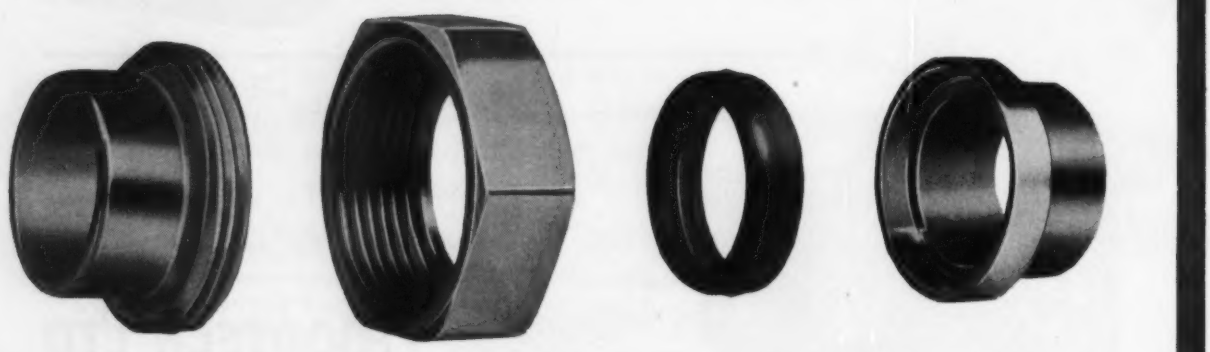

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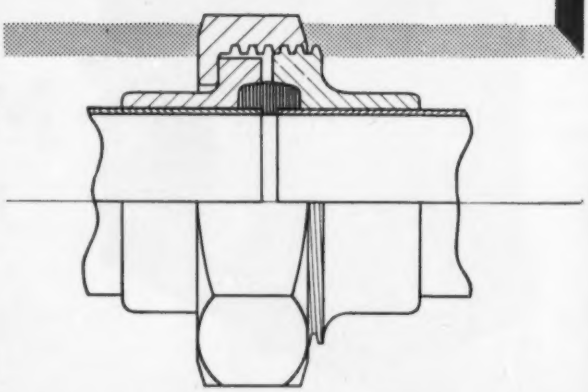
The CB/TS range of fittings includes unions, bends, tees, reducing bends and liners, blank caps and plug cocks. They are available in the following o.d. dimensions: 1″, 1¼″, 1½″, 2″, 2½″ and 3″.



CB/TS type fittings

CREVICE FREE AND TIGHTENED WITHOUT TOOLS

Write for full details to

TALBOT STEAD

TUBE CO. LTD · GREEN LANE · WALSALL · A TI COMPANY

MANUFACTURERS OF: SEAMLESS CARBON, ALLOY & STAINLESS STEEL TUBES · BI-METAL TUBES · METIOR PIPE FITTINGS · SANITARY PIPE FITTINGS
MACHINED PARTS & FLANGES · MANIPULATED & FABRICATED PIPEWORK
METICA METAL-CLAD CARBON OR GRAPHITE TUBES · FORJEND STAINLESS SEAMLESS WELDING FITTINGS · BRIGHT CARBON, ALLOY & STAINLESS BARS & WIRE

TBW/T84

The RIGHT Casing for QUALITY Sausage

Specially Selected

North American Hog Casings

Quality First

6, 8, 10, or 12 to the lb.

Put a first-class filling in a first-class casing and you have a product that welcomes competition. These North American Hog Casings, fine and tender eating, are specially selected, and nothing better has ever been offered to the British Meat Trader at any price.

Rush the Coupon Today to:

THE OPPENHEIMER CASING CO. (U.K.) LTD.

159-165 HARROW ROAD, LONDON, W.2. Telephone: PADdington 7431-5

Please rush me a quotation for North American Hog Casings.

6 sausages to the pound..... quantity

8 sausages to the pound..... quantity

10 sausages to the pound..... quantity

12 sausages to the pound..... quantity

Name .....

Address .....

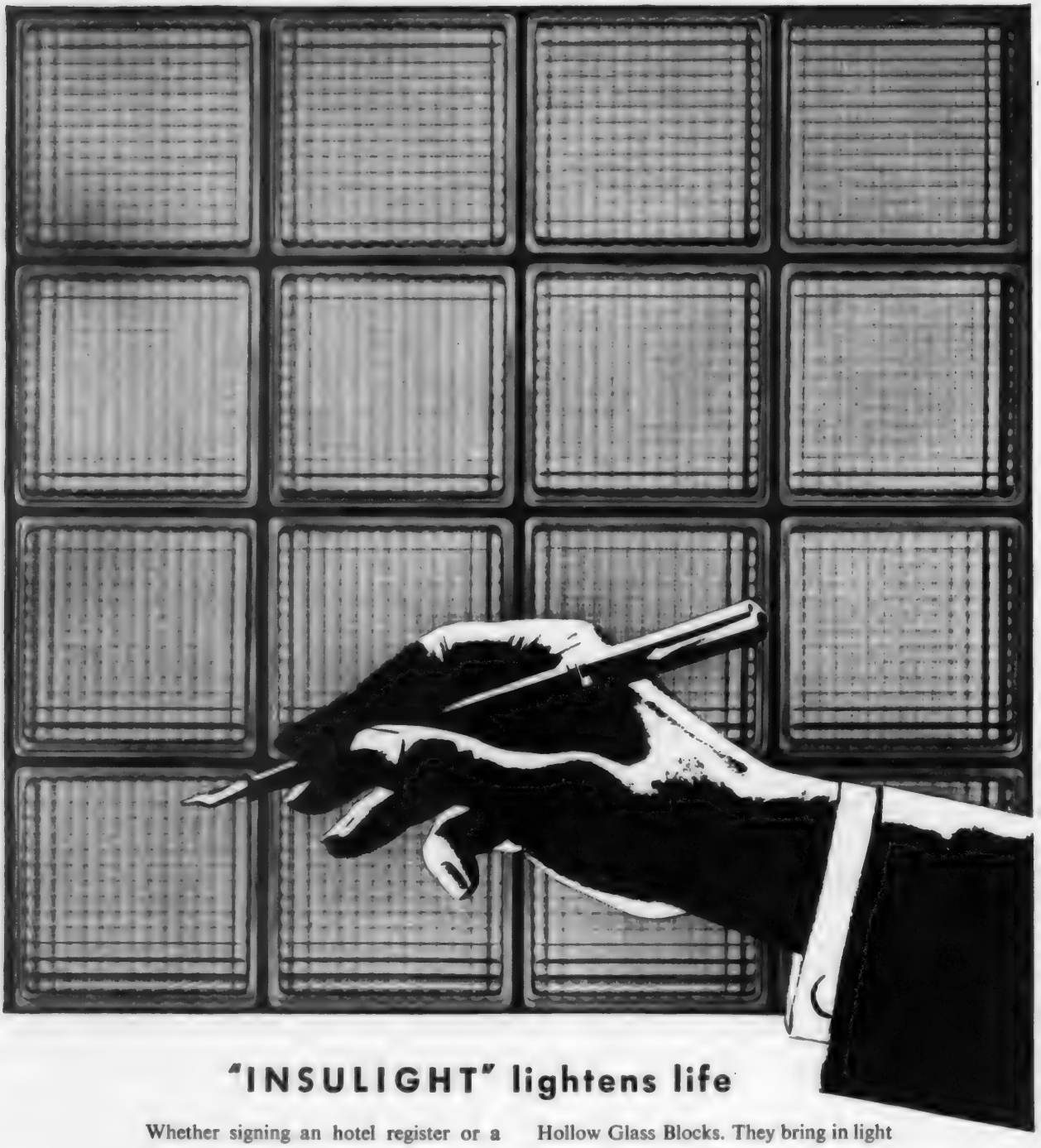
.....

.....

F.M. 1/56

Scottish Sales Depot: THORNYBAUK, FOUNTAINBRIDGE, EDINBURGH, 3

Tel.: FOUNTAINBRIDGE 1403



"INSULIGHT" lightens life

Whether signing an hotel register or a valuable contract, the right atmosphere is so important. Create that atmosphere with walls of light—built of "Insulight" Hollow Glass Blocks. They bring in light and keep out noise. They preserve privacy and stop heat losses. In many ways they make life lighter—and brighter.

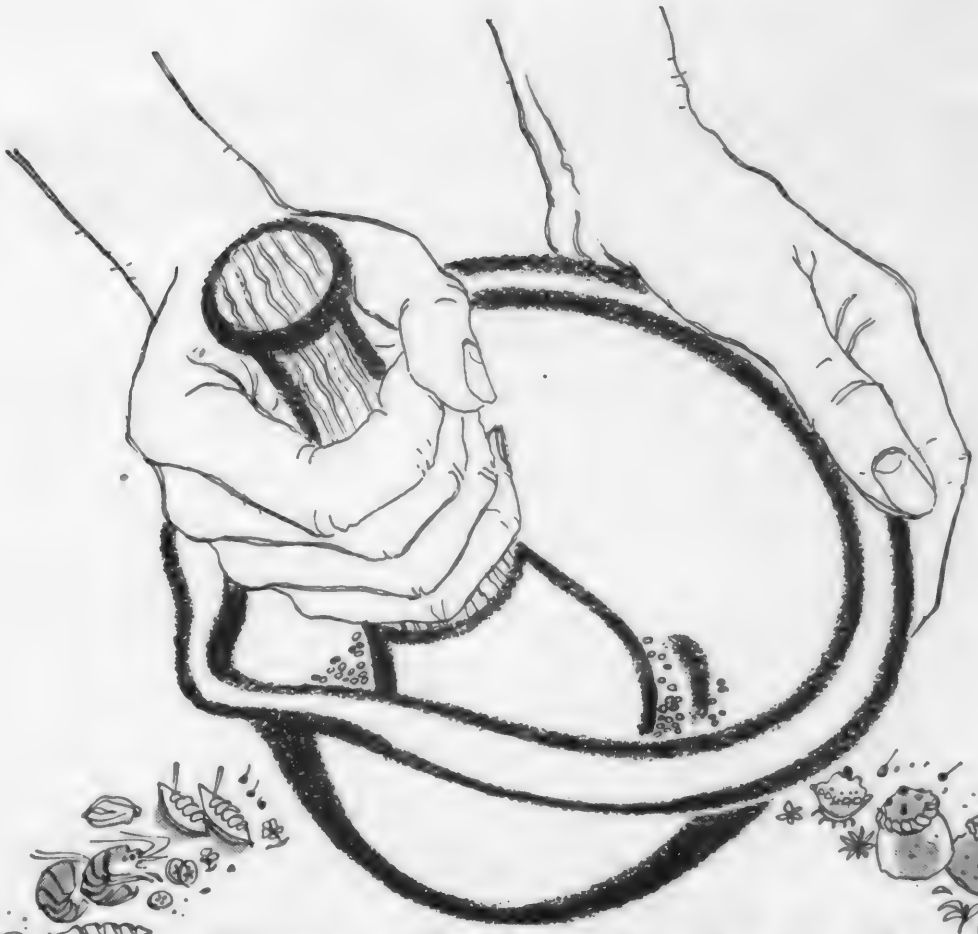
'INSULIGHT' HOLLOW GLASS BLOCKS

PILKINGTON BROTHERS LIMITED

FOR FURTHER INFORMATION ON THE USE OF GLASS IN BUILDING, CONSULT THE TECHNICAL SALES AND SERVICE DEPARTMENT, ST. HELENS, LANCS. (ST. HELENS 4001) OR SELWYN HOUSE, CLEVELAND ROW, ST. JAMES'S, LONDON, S.W.1 (WHITEHALL 5672-6). SUPPLIES ARE AVAILABLE THROUGH THE USUAL TRADE CHANNELS.

HG825

"INSULIGHT" is a registered trade mark of Pilkington Brothers Limited



Stirring the imagination in the

BOEHM EXPERIMENTAL KITCHEN

In the Boehm Experimental Kitchen problems of food flavouring are tackled by experts. It is possible that they have tackled and mastered the kind of flavouring problem now causing *you* concern. So it might save you time and money to get in touch with Fredk. Boehm Ltd. immediately. Certain flavours in certain world-famous products owe their popularity to this organisation. The same skilled assistance is at your service, too, and it's free.

Fredk. Boehm Ltd., continues to produce and distribute:

M S G Mono-sodium glutamate 99% pure
YEATEX Autolysed yeast extract
PROTEX Hydrolised protein

Fredk. Boehm Ltd., 19 Bentinck St., London, W.1. Telephone: Wel 7933

A FEW EXAMPLES OF OUR FINEST ADVERTISEMENTS

Our best advertisements are the actual plants we have designed, erected and put into operation. The versatility of the Redler system is truly amazing for REDLER plants are actively handling bulk products of all kinds, whether in granular, powdered, flaky or small lumpy form.

REDLER

REGISTERED TRADE MARK

REDLER CONVEYORS LTD

Dudbridge Works,
Stroud, Glos.

Telephone: Stroud 525-6
Telegrams: Redler Stroud

LONDON OFFICE:
47 Victoria St., S.W.1
Telephone: Abbey 2765

A quality setting for a famous name ...

This attractive gift pack* is just one example of the vast range of high-quality containers grouped under the simple trade term "rigid box".

Whether your product needs a straightforward rigid box or a padded casket . . . a satin-lined coffret or a box disguised as a rare book—whatever the package, it must compel the eye and whet the appetite. A customer interested in "what's outside" is halfway to buying what's inside.

We have been specialising in rigid boxes for three generations, and our labour force for this type of work is now one of the largest in England.

Why not write to-day for quotations—preferably enclosing a sample of your product?

***MADE BY HUNT PARTNERS FOR THE FAMOUS FIRM OF MESSRS. REUTER (4711 PRODUCTS).**

HUNT PARTNERS LTD

Rigid and Folding Boxes Designed and Printed by every Modern Method.

Head Office: Clapton, London, E.5.,
Phone: Amherst 3388 (10 lines).

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Phone: Aberkenfig 367

SHATTERED!

He's unhappy, weary and worn, he's not sleeping nights . . . you know, not getting that deep relaxed sleep the beverage ads. tells us about. In short, he's shattered!

Why? That's easy enough to explain . . . instead of calling in a BROOK specialist when he has an electric motor problem he tries to work it out on his little lonesome . . . he could do the sensible thing and call in his nearest Brook representative.

BROOK MOTORS Ltd
HUDDERSFIELD
ENGLAND

All you need do is ring –

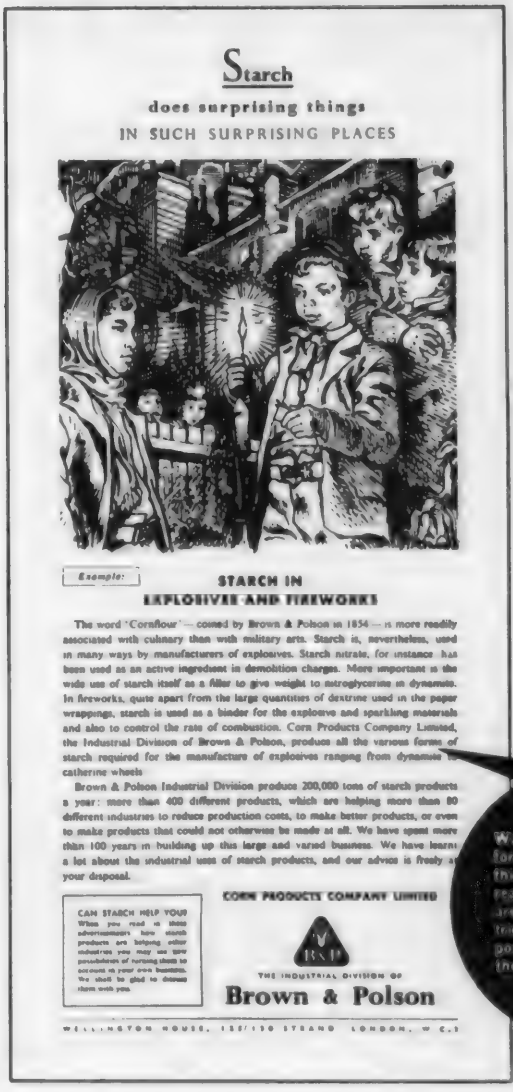
Huddersfield 6400/7 • London ABBey 7626/9 • Aberdeen 21890 • Birmingham CENtral 1988 & 2120 • Bristol 24427 • Glasgow CENtral 1045 • Leeds 34303/4 • Leicester 58334 • Liverpool ROYal 4100 • Manchester BLAckfriars 5030 & 4138 • Newcastle 26763 • Norwich 25099 • Nottingham 40184 • Plymouth 2609 • Sheffield 28477/8 • Swansea 57559

55/24

FOR 80 INDUSTRIES

More than 400 Brown & Polson Starch Products

The deep knowledge and wide practical experience we have gained by our huge and varied production for other industries is your guarantee that our starch products for the preserving industry will always be the best that can be made. And we can promise you knowledgeable and disinterested advice whenever you care to discuss with us proposed new uses for starch products in your business.

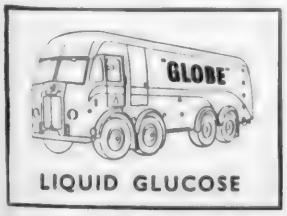

Starch
does surprising things
IN SUCH SURPRISING PLACES
Example:
STARCH IN
EXPLOSIVES AND FIREWORKS
The word "Cornflour" — coined by Brown & Polson in 1854 — is more readily associated with culinary than with military arts. Starch is, nevertheless, used in many ways by manufacturers of explosives. Starch nitrate, for instance has been used as an active ingredient in demolition charges. More important is the wide use of starch itself as a filler to give weight to nitroglycerine in dynamite. In fireworks, quite apart from the large quantities of dextrine used in the paper wrappings, starch is used as a binder for the explosive and sparkling materials and also to control the rate of combustion. Corn Products Company Limited, the Industrial Division of Brown & Polson, produce all the various forms of starch required for the manufacture of explosives ranging from dynamite to catherine wheels
Brown & Polson Industrial Division produce 200,000 tons of starch products a year: more than 400 different products, which are helping more than 80 different industries to reduce production costs, to make better products, or even to make products that could not otherwise be made at all. We have spent more than 100 years in building up this large and varied business. We have learnt a lot about the industrial uses of starch products, and our advice is freely at your disposal.
CAN STARCH HELP YOU
When you read in these advertisements how starch products are helping other industries you may see new possibilities of turning them to account in your own business. We shall be glad to discuss them with you.
CORN PRODUCTS COMPANY LIMITED
B&P
THE INDUSTRIAL DIVISION OF
Brown & Polson
WELLINGTON HOUSE, 125/130 STRAND LONDON, W.C.2
Watch the National press for advertisements like this one. When you read how starch products are helping other industries you may see new possibilities of turning them to account in your own business.

for you, in the Preserving Industry

Most jam manufacturers have encountered the problem of making jams that contain enough soluble solids to be satisfactory in quality, yet are not too sweet for their customers' taste and will not crystallise in storage. Most jam manufacturers are also aware that the best answer to this problem is to use less cane or beet sugar (sucrose) in their jams and make up the required soluble solids content with "Globe" liquid glucose.

Glucose provides abundant food energy but is not as sweet as sucrose. When glucose is used in jam making to replace some of the sucrose it reduces excessive sweetness without reducing food value; it brings out the natural flavour of the fruit; it helps the jam to set; and it prevents crystallisation.

"Globe" liquid glucose is made from starch by Corn Products Company Limited—the Industrial Division of Brown & Polson—and we make the starch, too. Our careful control of every manufacturing process from the grain to the finished product is your assurance of the quality and purity you require in your preserves.



CORN PRODUCTS COMPANY LIMITED

THE INDUSTRIAL DIVISION OF B&P Brown & Polson

WELLINGTON HOUSE, 125-130 STRAND, LONDON, W.C.2

BRITISH ROAD SERVICES

BRITISH ROAD SERVICES LTD • B.R.S. (PARCELS) LTD • B.R.S. (CONTRACTS) LTD • B.R.S. (PICKFORDS) LTD

Dependability To an increasing extent, efficient, dependable communications are becoming the first necessity of twentieth century industry.

British Road Services know how to give industry the right service, the service that provides something more than good transport : co-operation, confidence, customer satisfaction—whatever the job. Yet the rates charged are competitive and reasonable. Wherever your business may be, and whether the service required be General Haulage, Parcels/Smalls Collections and Deliveries, the supply of vehicles on Contract or the provision of special vehicles for Household Removals, Indivisible Loads or Liquids in Bulk, British Road Services are ready to discuss your requirements.

If you are not already a customer, write or telephone the Divisional Manager for your part of the country, who will be happy to put you in touch with your nearest service point.

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TELEPHONE : Euston 7030

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(*Northumberland, Durham, Yorkshire, North Nottinghamshire, Lincolnshire*)
20 22 St. Paul's Street, Leeds 2.

TELEPHONE : Leeds 31771

SCOTTISH

(*All Scotland*)
11 Bothwell Street, Glasgow, C.2.

TELEPHONE : City 7011

MIDLAND

(*Derbyshire, South Nottinghamshire, Staffordshire, Warwickshire, Leicestershire, Northamptonshire, Cambridgeshire, Bedfordshire*)
30 Harborne Road, Edgbaston, Birmingham 15.

TELEPHONE : Edgbaston 3841

NORTH WESTERN

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Commercial Chambers, 47 Corporation Street, Manchester, 4.

TELEPHONE : Deansgate 7561

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(*Mid and South Wales, Shropshire, Herefordshire, Gloucestershire, Oxfordshire, Berkshire, Wiltshire and the West Country*)
Andrews Arcade, Queen Street, Cardiff.

TELEPHONE : Cardiff 23121

PICKFORDS

(*Specialised Services throughout the British Isles*)
205 High Holborn, London, W.C.1.

TELEPHONE : Holborn 8021

BRITISH ROAD SERVICES

THE CAP THAT'S EASY TO REMOVE . . .

. . . yet easy to put on and safe in transit

Metal Box *know-how* does count!

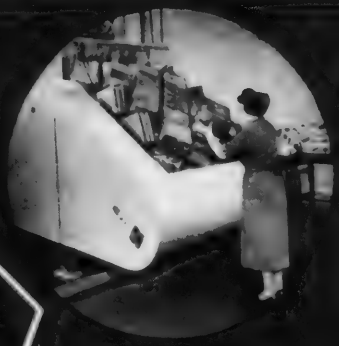
The new Garda Cap, a recent product of the Metal Box Company's Cap Group, has been ingeniously designed for the high speed hermetic sealing of jam and preserve jars. Made of light gauge aluminium with a tapered rim, the Garda Cap can be stacked conveniently for feeding into fully automatic closing machines—also supplied by Metal Box—and can be used with British standard jars. The method of application which embodies the process of vapour sealing ensures an efficient seal, yet because of its split skirt the Cap can be easily removed when pierced. The Metal Box Capping Service does more than provide a suitable cap for a special purpose. It assists the packer with expert guidance on the methods of sealing and it supplies and advises on the use of his sealing machines. Moreover, it enables him to gear his closing operations to the speed of his production and filling lines.

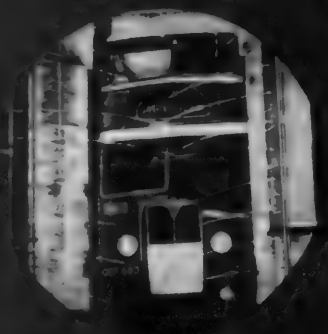
THE METAL BOX COMPANY LIMITED

Metal Containers · Paper Products · Flexible Packages · Plastic Films & Laminates

THE LANGHAM · PORTLAND PLACE · LONDON W.1

Problem,





Dawson

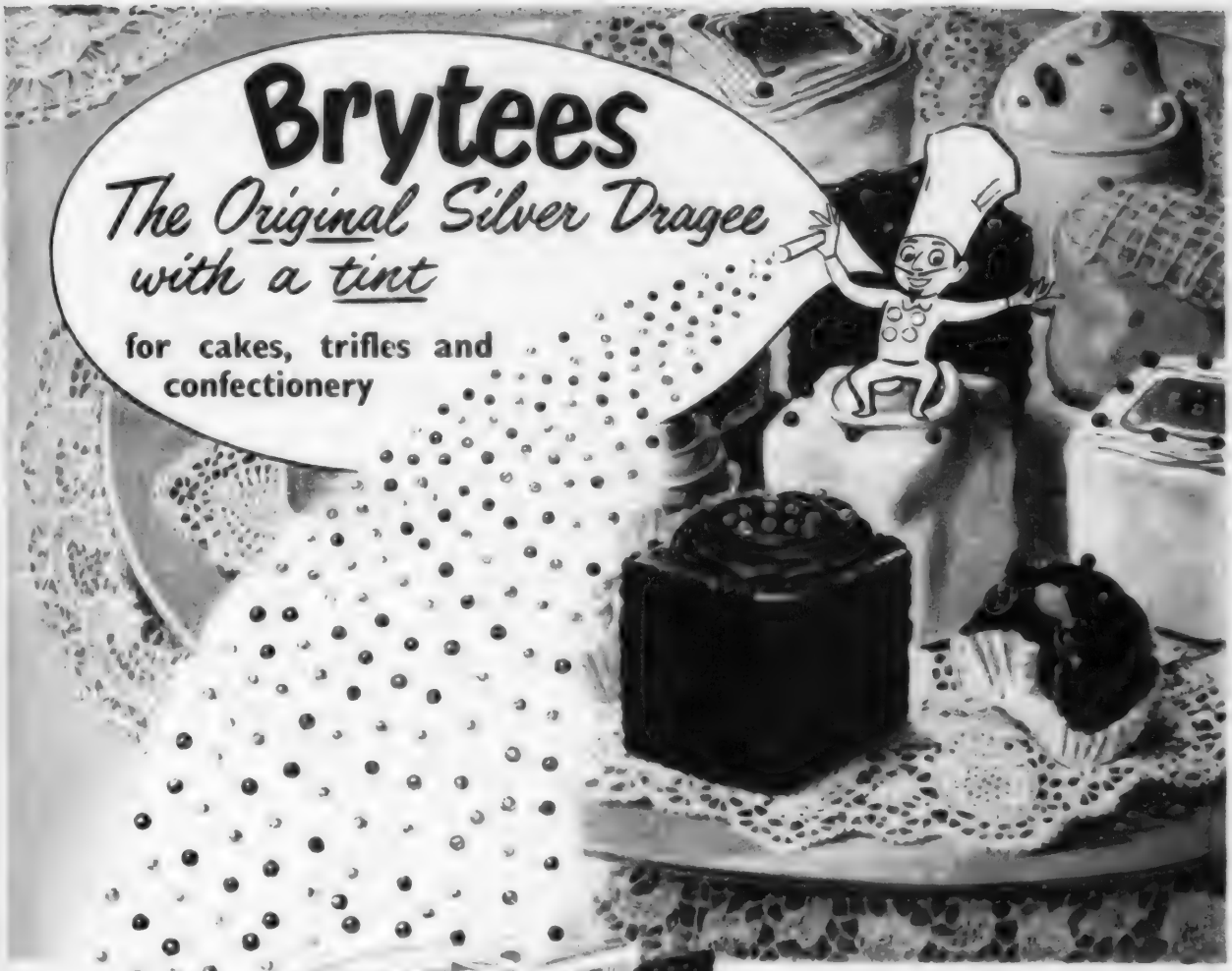
WASHING & DRYING PLANT

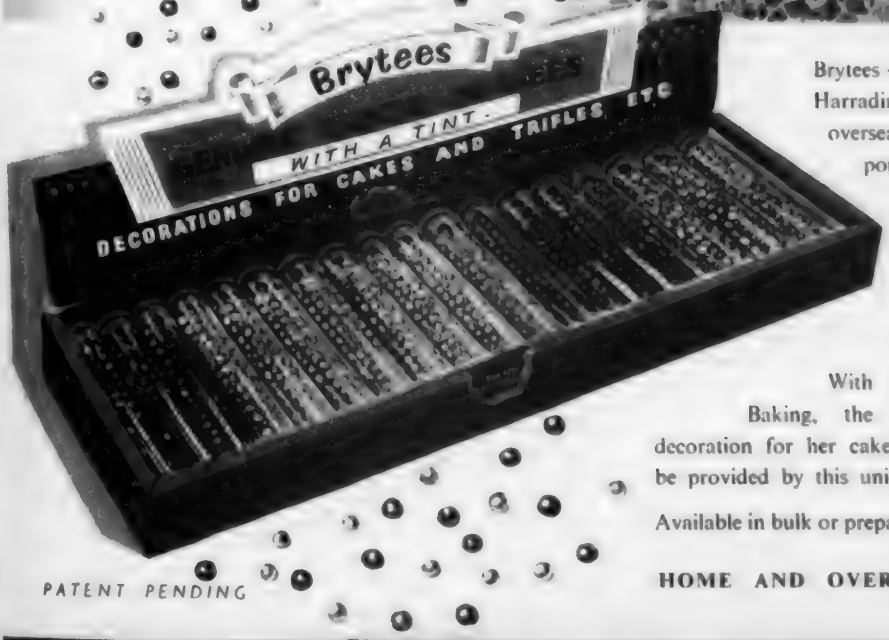
DAWSON BROTHERS LTD. SOWERBY BRIDGE NR. LEEDS

Brytees

The Original Silver Dragee with a tint

for cakes, trifles and confectionery





PATENT PENDING

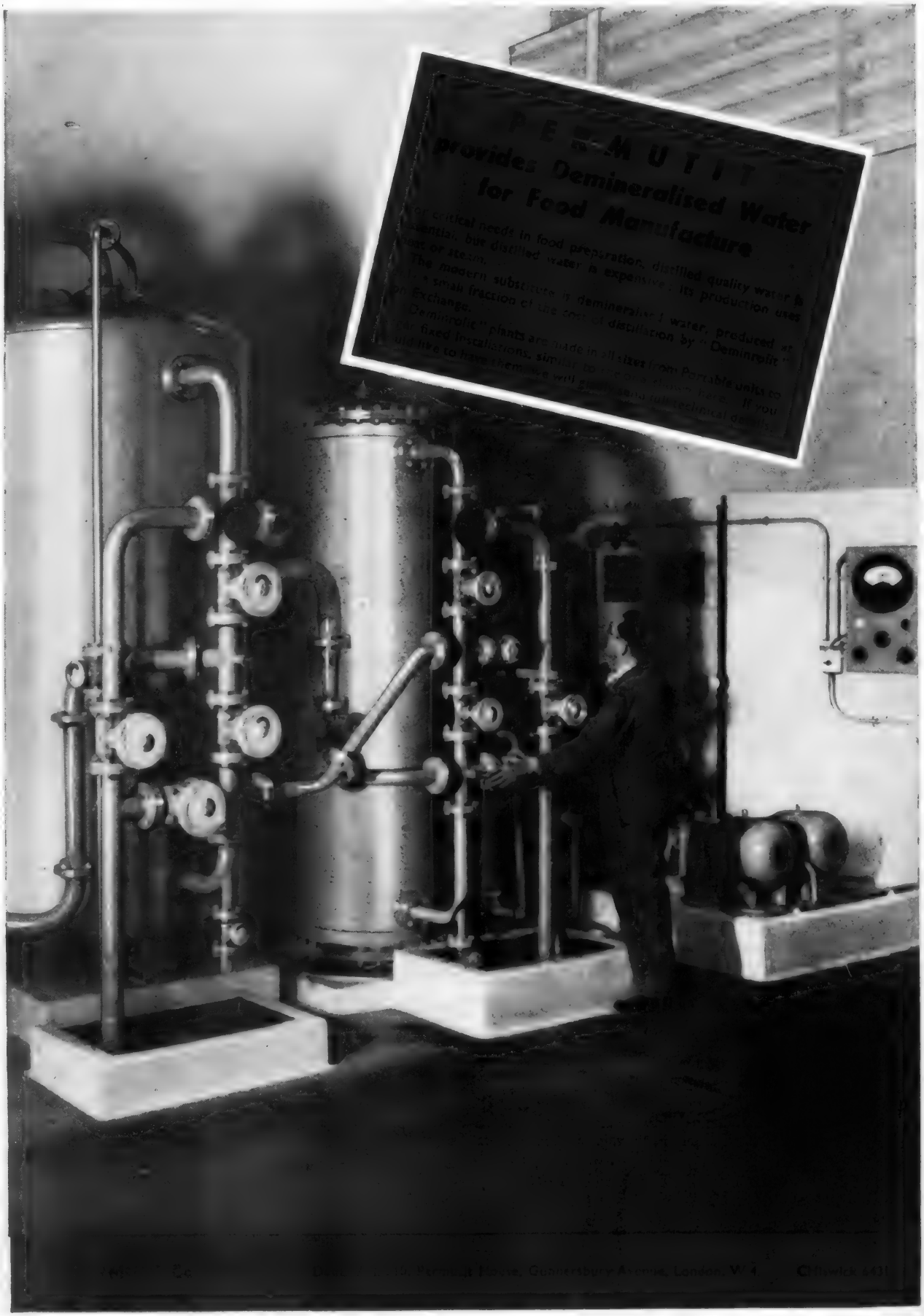
Brytees — so successfully introduced by Harradine's—are today being sold in 16 overseas markets where their established popularity demands frequent shipments.

These brilliant Silver Dragees in many different transluscent colours are fast becoming as famous as their counterpart the traditional St. James Silver Dragees.

With the rapid swing-back to Home Baking, the housewife seeks perfection in decoration for her cakes and party-table which can only be provided by this unique product.

Available in bulk or prepacked in this attractive display carton

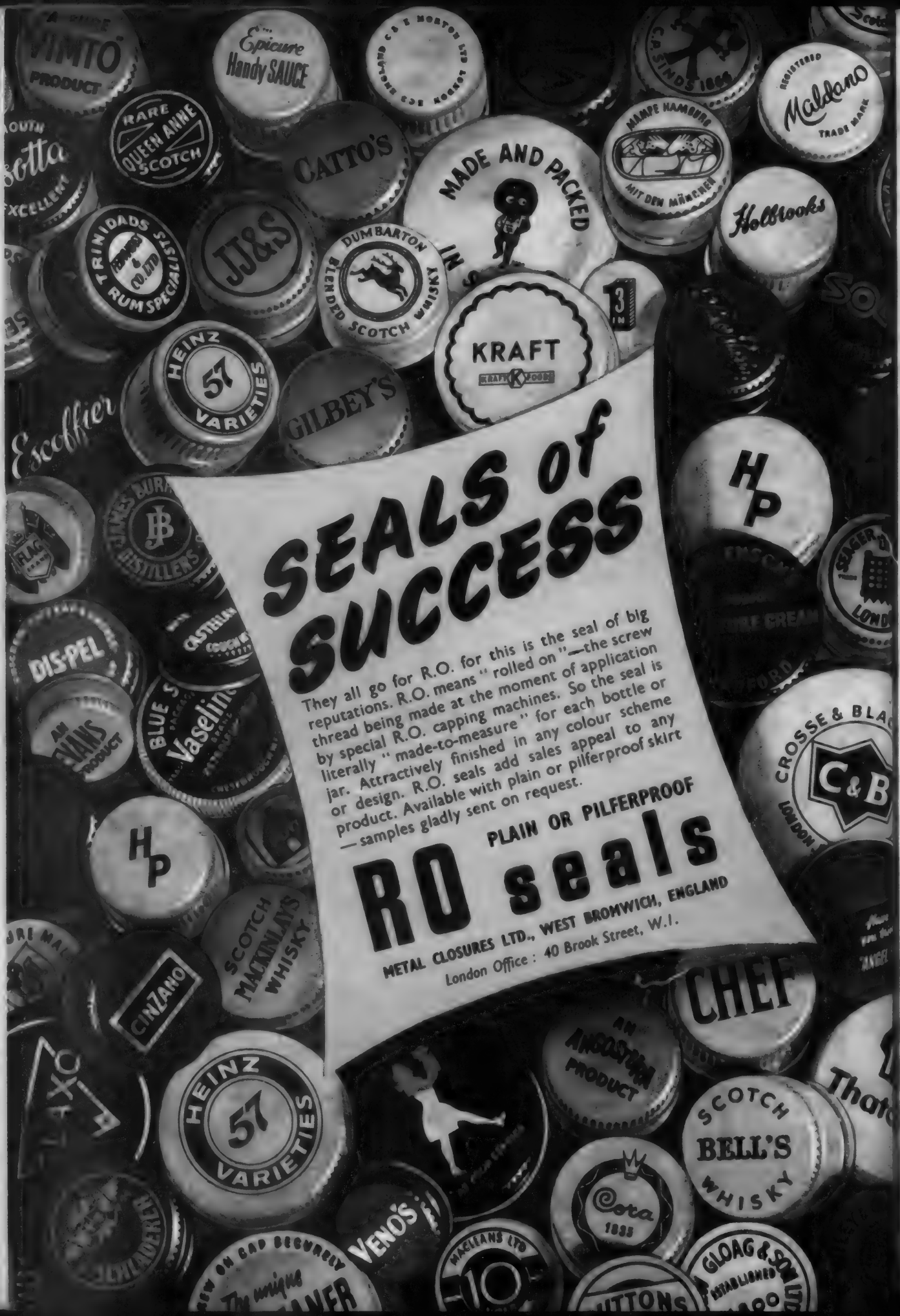
HOME AND OVERSEAS ENQUIRIES INVITED

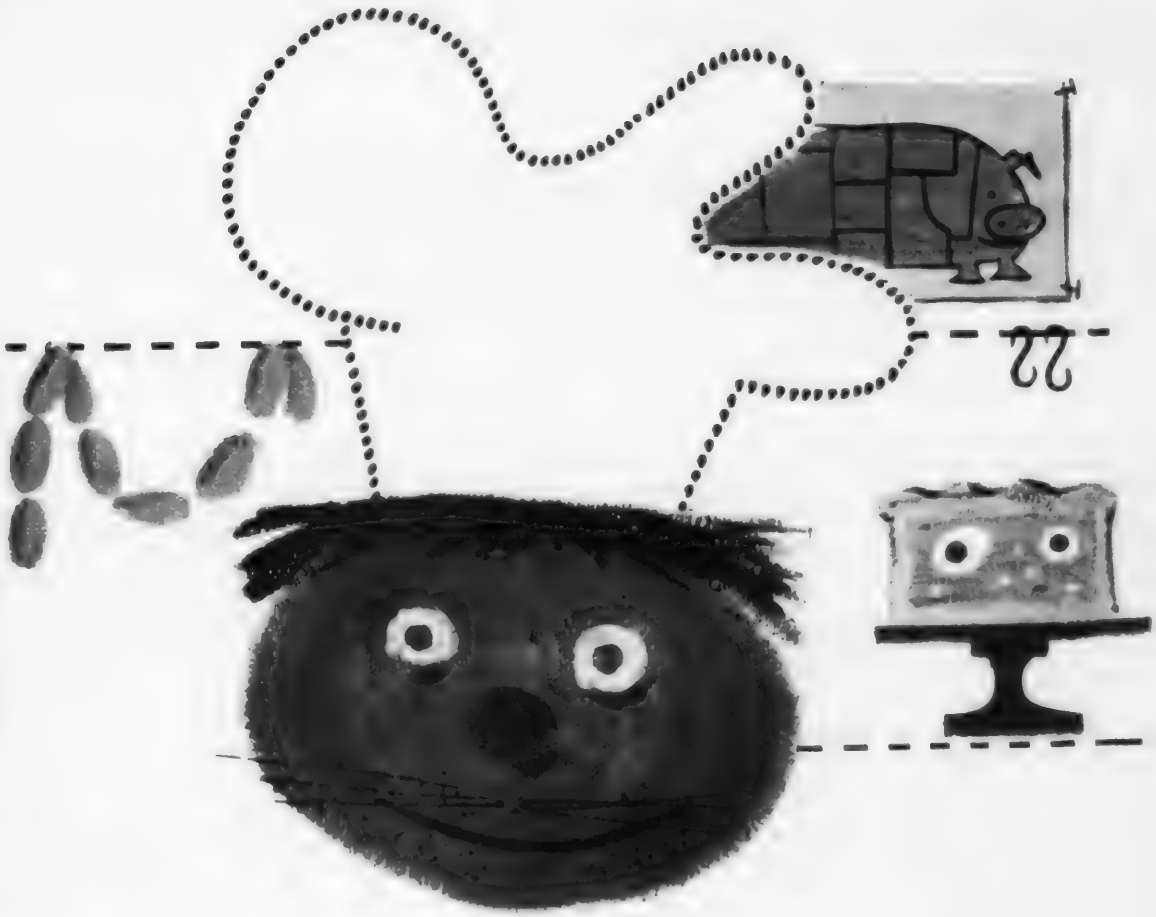

provides Demineralised Water
for Food Manufacture

-consistently good

VENESTA FOIL

VENESTA LIMITED *Packaging Division*, Vintry House, Queen St. Place, London, E.C.4. *CENtral* 3040


SEALS of SUCCESS
They all go for R.O. for this is the seal of big reputations. R.O. means "rolled on"—the screw thread being made at the moment of application by special R.O. capping machines. So the seal is literally "made-to-measure" for each bottle or jar. Attractively finished in any colour scheme or design. R.O. seals add sales appeal to any product. Available with plain or pilferproof skirt —samples gladly sent on request.
PLAIN OR PILFERPROOF
RO seals
METAL CLOSURES LTD., WEST BROMWICH, ENGLAND
London Office: 40 Brook Street, W.1.
MADE AND PACKED IN
KRAFT
CATTO'S
HEINZ 57 VARIETIES
DUMBARTON BLENDED SCOTCH WHISKY
TRINIDADS RUM SPECIALISTS
JJ&S
Holbrooks
Maldano
Escoffier
GILBEY'S
DIS-PEL
Vaseline
CROSSE & BLACKWELL
C&B
CHEF
SCOTCH BELL'S WHISKY
SCOTCH MACKINLAY'S WHISKY
CINZANO
VENO'S
GLOAG & SON



EDICOL SUPRA COLOURS

for SAUSAGES and MEAT PRODUCTS

Edicol Supra Colours meet the highest standards of purity demanded by the most stringent regulations in the world.

Their purity is protected by delivery in sealed packages.

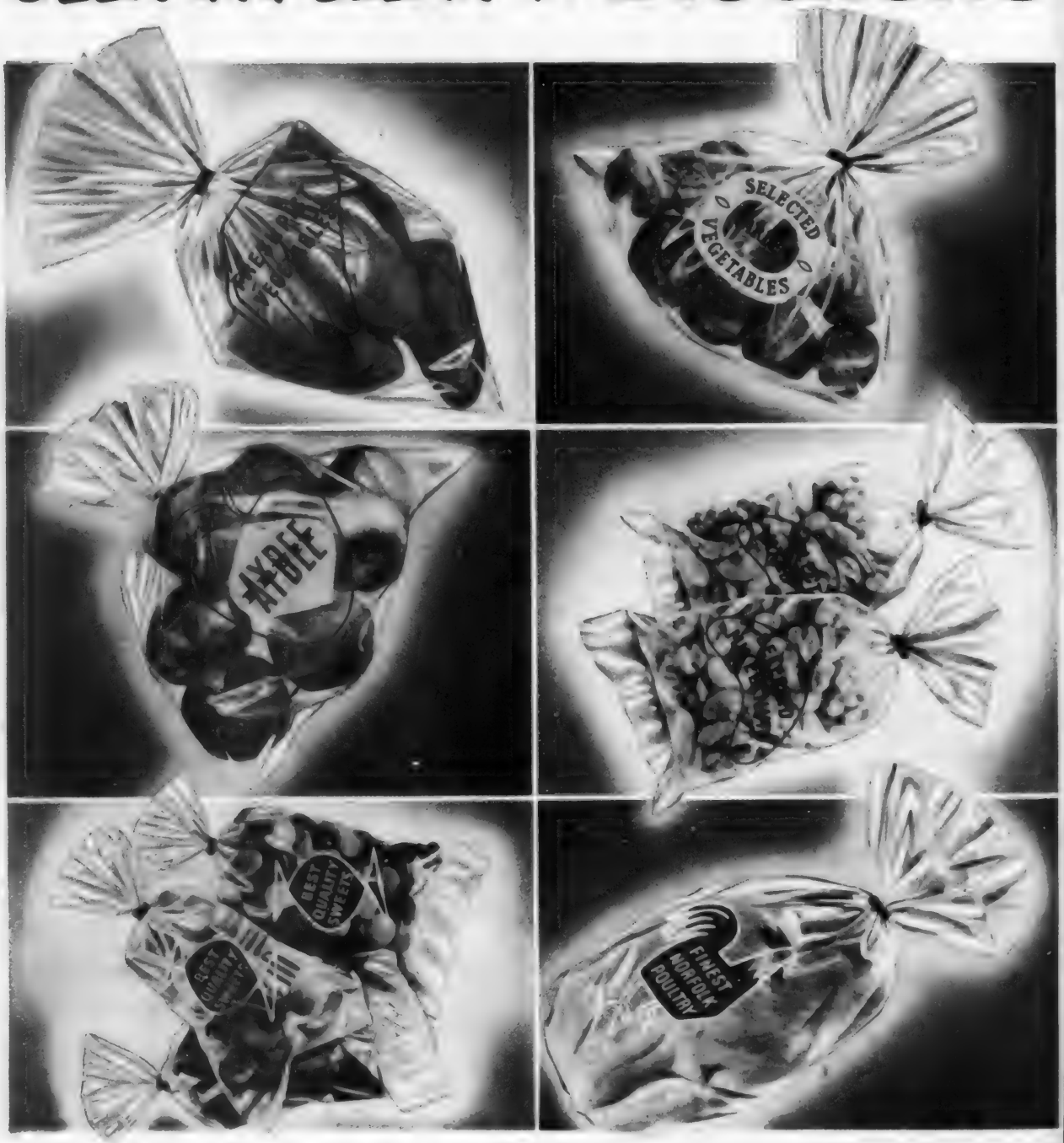
"Certified" supplies of many are available for food processors exporting to the United States.

Technical literature and full information on request

IMPERIAL CHEMICAL INDUSTRIES LTD LONDON SW1

D.524

SEEN and CLEAN in Diothene



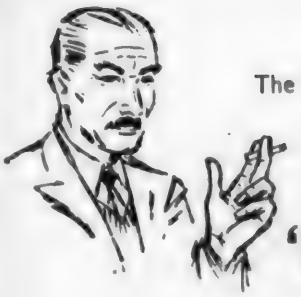
Diothene is a new flexible film for packaging. It is transparent for sales appeal, tough for protection and perfectly hygienic. Diothene has no odour, is non-toxic and cannot taint any food product. Diothene cannot cause corrosion in contact with metals. Heat sealing forms a strong durable weld, giving it excellent handling properties.

MB DIOTHENE (POLYTHENE)

The tough transparent film that *ADDS SALES APPEAL!*

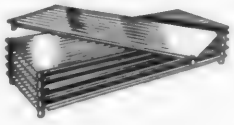
THE METAL BOX COMPANY LTD · *Flexible Packaging Division* · **THE LANGHAM · PORTLAND PLACE · LONDON W.1**

PP3336



The CHIEF ENGINEER says—

'Strong-light-clean-smooth-easy stacking WARWICK has everything'



STACKING CONTAINER

Cat. No. CS 24146

A very robust container in 13 gauge Aluminium Alloy, one piece Pressing 23¾" x 6" (inside dimensions). Variations as follows:—

CSDH 24146 with space for impressing customers initials.

CSH 24146 stacking container with hand holes.

CSD 24146 stacking container with drainage or ventilation holes but no hand holes.

WARWICK PRODUCTION COMPANY LTD

IN ASSOCIATION WITH **ALMIN LIMITED** STOKE POGES · BUCKS

BIRMINGHAM ROAD, WARWICK TELEPHONE: WARWICK 693-696

This modern battery of high speed Broadbent Centrifugals in Australia processes a large output of superior quality white sugar.

FOOD RAPIDLY AND HYGIENICALLY PROCESSED THE BROADBENT WAY

To process modern foods economically, effectively and with maximum output, insist on installing BROADBENT HIGH-SPEED CENTRIFUGALS. The extensive range covers numerous applications and the prepared food retains its original flavour and purity as suitable corrosion resisting materials are used.

THOMAS BROADBENT & SONS LIMITED

"CELLOPHANE" PUTS FOOD IN ITS PLACE... in the shopper's basket!

At the present rate of progress, the bulk of the Nation's foodstuffs will eventually reach the shopper's basket in pre-packaged form.

A survey showed that 87% of shoppers' impressions are controlled by sight and this is your best card to play in the Pre-packaging Era!

"Cellophane" gives strong and flexible packs, more transparent than window glass. Customers can see *every* detail of *every* batch of your product. Where nothing is hidden, confidence is created . . . and pre-packaging is off to the best possible start!

SEEN . . . . . AND SEEN FRESH

All types of "Cellophane" are impervious to dust and grease. All non-coloured moistureproof types of "Cellophane" have an ANCHORED coating which moisture cannot shift. Foodstuffs are not only *seen* in "Cellophane" they are seen protected and *FRESH*.

B.C.L. FILM ADVISORY SERVICES

Await Your Use Without Obligation . . . For The Better Film-Packaging Of Your Products.

DESIGN, ART WORK, HIGH-QUALITY PRINTING AND BAG-MAKING

Colodense Ltd., an associate of British Cellophane Ltd., supplies film as reels, wrappers and bags with brilliant multi-colour printing, as well as plain bags of all types for the pre-packaging of foodstuffs.

"CELLOPHANE"—the first packaging film—and the greatest!

CONSULT US TODAY

BRITISH CELLOPHANE LIMITED

Commercial Offices: 12/13 Conduit Street, London, W.1
Reg. Offices & Factory: Bath Road, Bridgwater, Somerset

"Cellophane" is the registered trade mark of British Cellophane Limited and denotes the brand of cellulose film manufactured by them

COLT ventilation right from the start

AT PRICE'S (SOUTHERN CONFECTIONERS) BAKERY

Architect : A. J. Seal and Partners, F.R.I.B.A., Bournemouth and London

Ventilation is a matter for experts—a fact well appreciated by industrial architects. So the architect specified Colt Ventilation for the extension to Price's Bakery at Eastleigh—and consulted Colt at the planning stage. Colt technical staff prepared a natural ventilation scheme; sited Colt General Purpose Ventilators at low level for air inlet and Colt SRC. 2046 High Duty Extractors in the roof—directly over the main sources of heat and moisture.

Both extensions are now in full production in ideal ventilation conditions—achieved at low initial cost and without any running and maintenance costs.

Price's are one of over 8,000 major industrial organisations who have benefited from Colt's expert advice and wide range of ventilating systems.

COLT

***WRITE FOR FREE MANUAL** with full specifications of Colt Ventilators to Dept. S/42/259*

VENTILATION

COLT VENTILATION LTD · SURBITON · SURREY

Telephone: Elmbridge 6511

Branches at Birmingham, Bradford, Bridgend (Glam.), Bristol, Coventry, Dublin, Edinburgh, Liverpool, London, Manchester, Newcastle-upon-Tyne, Sheffield and Warwick.

Agents in Australia, Belgian Congo, Canada, Cyprus, India, Indonesia, Madagascar, Malaya, Mauritius, New Zealand, Pakistan, Portugal, North and South Rhodesia and South Africa.

SPECIALITY
BISCUIT FLAVOURS
LINCOLN CREAM • COCONUT CREAM • TEA
MARIE • PETIT BEURRE • CUSTARD CREAM
CROMWELL • VANILLA • MADEIRA • CHOCOLATE
etc. etc.
We offer a complete range of speciality biscuit flavours which have been devised, as a result of our own research, to stand high temperature work. We shall be pleased to send on request whatever samples you may require for a test batch.
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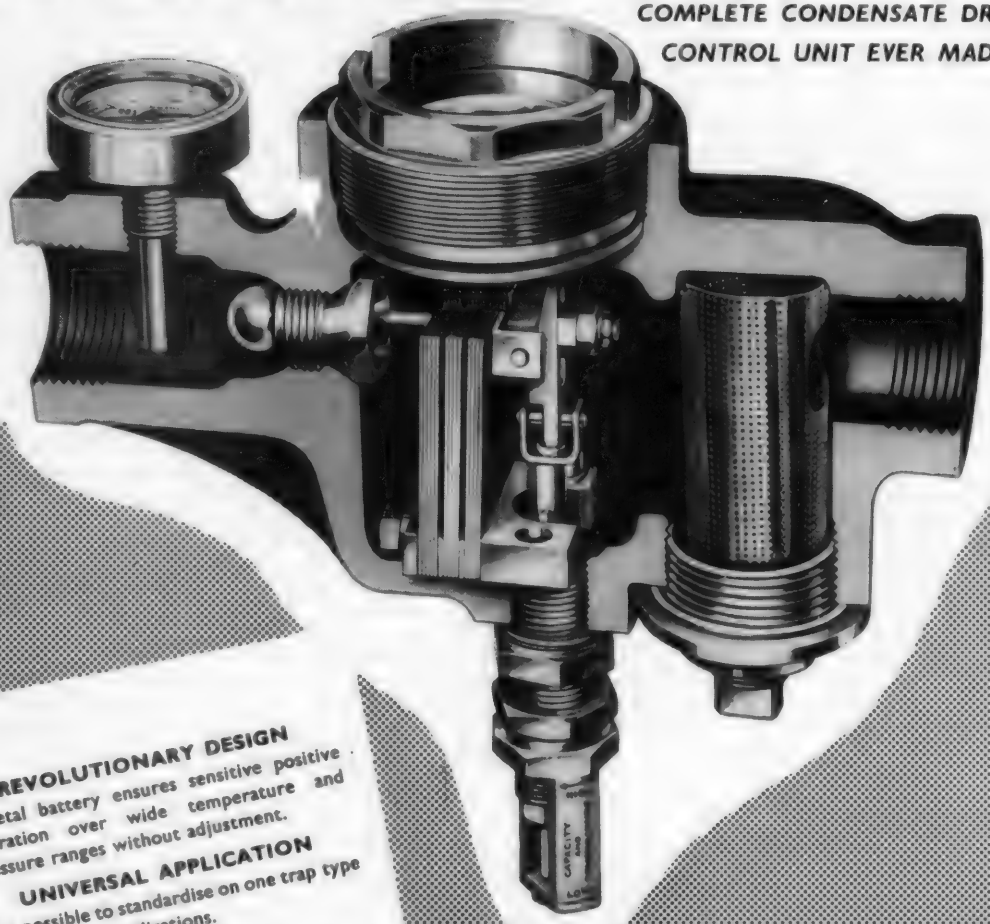
TAFFORD ALLEN & SONS LTD.
WHARF ROAD · LONDON · N.1
Telephone CLErkenwell 1000 (7 lines)

VELAN

THE FINEST AND MOST COMPLETE CONDENSATE DRAINAGE CONTROL UNIT EVER MADE



REVOLUTIONARY DESIGN

Bimetal battery ensures sensitive positive operation over wide temperature and pressure ranges without adjustment.

UNIVERSAL APPLICATION

It is possible to standardise on one trap type for all normal applications.

TYPES

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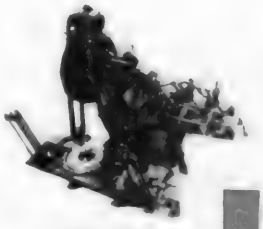

Strip Feed Press

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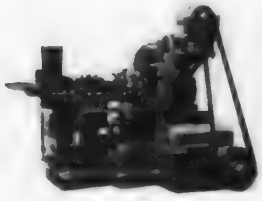
Side Seamer



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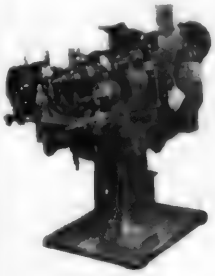
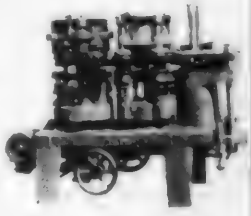


Thread Roller



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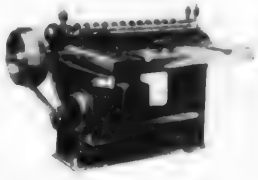
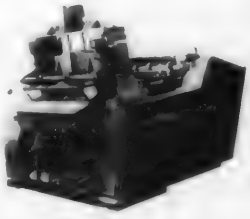


Gang Slitter

Air Tester



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Above: Upper chamber and heating tubes, showing complete accessibility for cleaning when the hinged cover is swung open.

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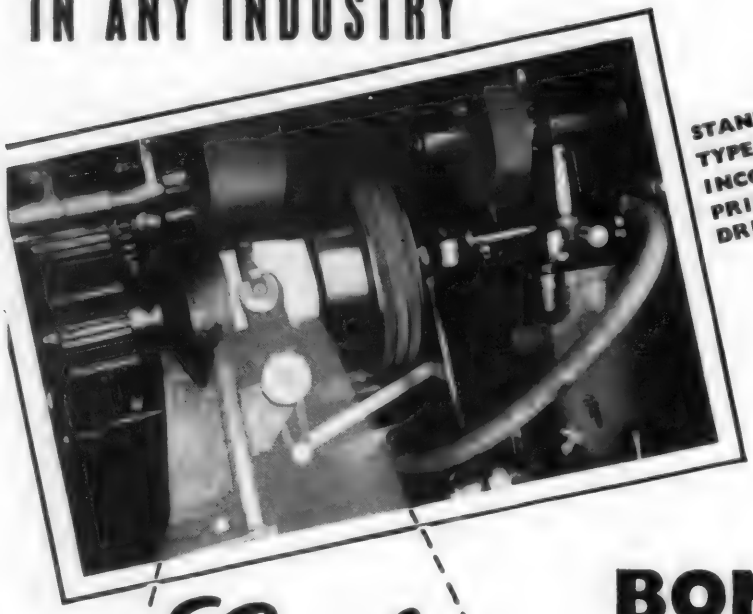

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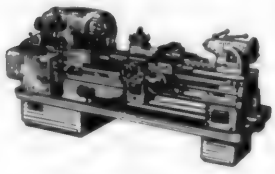
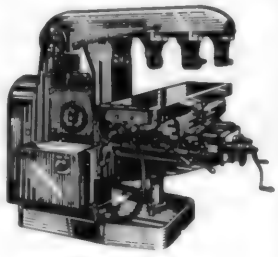
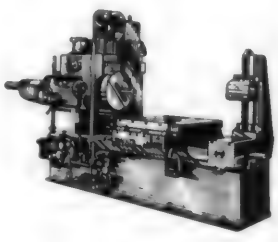
TYPICAL APPLICATIONS



Centre Lathe



Milling Machine



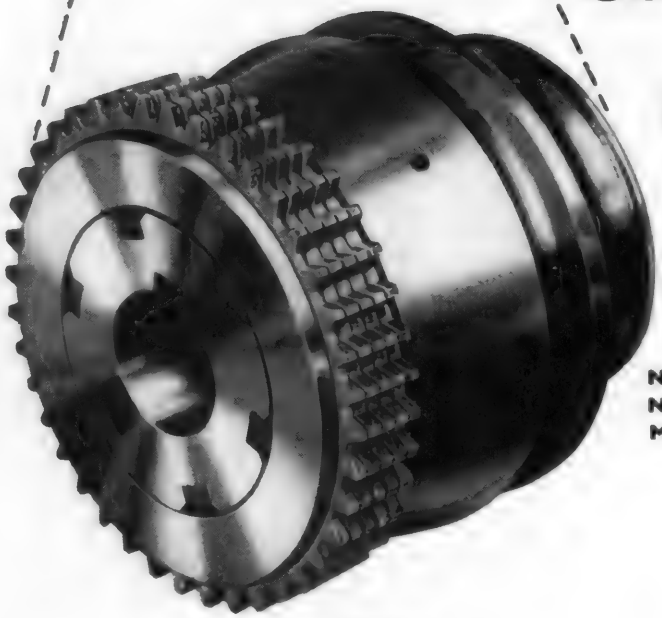
Boring & Turning Mill

Food Processing Machine

Crofts

BOM-L MULTIPLE-DISC CLUTCHES

COMPLETE THE PICTURE



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ADDRESS .....

PRODUCT .....

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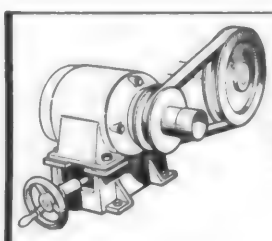

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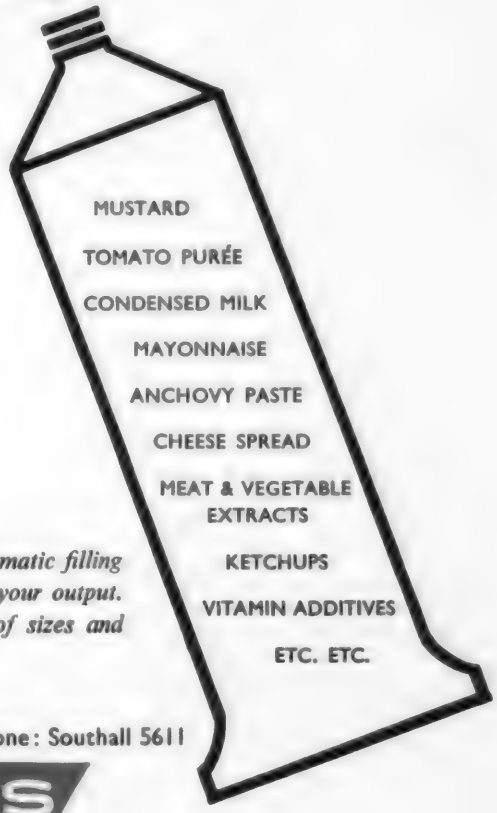
And it has SALES APPEAL
Tubes have eye and palate appeal — they sell more!



Our Technical Division is ready to co-operate on any tube-packaging project and work with you in developing it. Please write or telephone:

Hand or automatic filling according to your output. Wide range of sizes and capacities.

H. G. SANDERS & SON LTD., Gordon Road, Southall, Middx. Telephone: Southall 5611

SANDERS
OUR 10TH YEAR

for food-packaging in Tubes

a HUGE Stride Forward in Container Filling Technique

Note the dial thermometers (one per pump) and the tachometer to indicate filling rate per minute and record total fillings during run.

KELLIE'S NEW AUTOMATIC STRAIGHT-LINE FILLING MACHINE

for liquids, semi-liquid and viscous products including jams, jellies, marmalades, soups, syrups, lemon curd, creams, etc.

A FEW OUTSTANDING ADVANTAGES

Infinitely variable filling rates
(according to product and type of container)
30 to 240 1 lb. containers per minute
60 to 240 ½ lb. containers per minute
30 to 120 2 lb. containers per minute
30 to 80 3 lb. containers per minute

Infinitely variable conveyor speed
Automatic continuous container feed and delivery from 30 to 240 per minute on stainless-steel-slat conveyor.

Comprehensive safety standards
Pumps and conveyor electrically interlocked (both starting and stopping). Foolproof mechanical interlocking between pumps. Full enclosure of driving mechanism and electrical controls. Smooth contouring for hygiene preservation.

Micro-regulation whilst filling
Smooth and accurate filling, non-spilling, non-aerating, micro-regulated whilst machine is running.

Infinitely variable pump delivery
130 to 344 gallons per hour from each of two pumps—operable separately, simultaneously or consecutively.

Perfect protection of products
Whole-fruit strawberries and cherries, for example, are not even bruised.

Write at once for the complete specification and learn just how much you will gain in speed, efficiency, accuracy, economy and convenience. Specify KELLIE TYPE 11FP (Patents pending).

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The last word in Filling Machines ... by KELLIE ... of course

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ADVITA specialise in the preparation of solutions of synthetic vitamins A and D_2 in groundnut oil which have a reputation for the highest stability and chemical purity among a large proportion of margarine and other foodstuff manufacturers, both in this country and overseas.

To meet the varied demands of their customers ADVITA make their vitamins available in bulk or in individual containers which provide sufficient for the exact vitaminisation of a specific batch of material. *This unique service is available to all users of oil soluble vitamins.*

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whatever destination

YOUR PRODUCT

will arrive in

A Better Condition

if you use

SEALING MACHINES or **MATERIALS**

BUTTERFLY BRAND

NONCURLING GUMMED PAPERS for labelling every kind of product.

GUMSTRIP* SEALING TAPES AND GUMSTRIP* SEALING MACHINES for sealing parcels, packets and cartons.

SAMSON* ADHESIVES for every trade.

SELF-ADHESIVE SEALING TAPES for security-protection and airtight sealing.

HEATFIX PAPERS for labelling, packaging, etc.

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COUNTER ROLL HOLDERS for packing various sized parcels, available in 7 widths.

WATERPROOF MATERIALS for home and export packing.

THE LIGHTNING* LABELLER moistens gummed labels in a second. Made in 3 in., 5 in. and 9 in. widths.

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Braby stacking trays

for hygienic handling of meat

These trays are light, strong and designed to facilitate cleaning and sterilisation. They are made in one-piece pressings from an aluminium alloy specially resistant to corrosion. Trays are supplied with or without ventilating louvres and the tray bottoms are available pierced or slotted for drainage.

Supplied in two sizes:
20″ × 15″ × 6″ deep, capacity 1660 cu. in.
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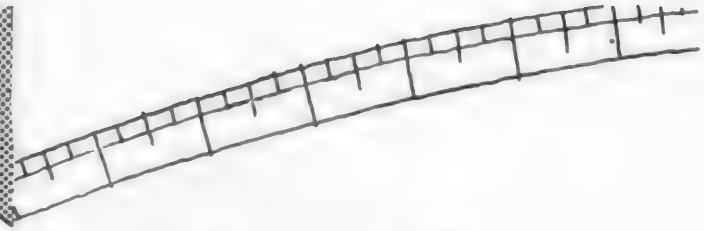
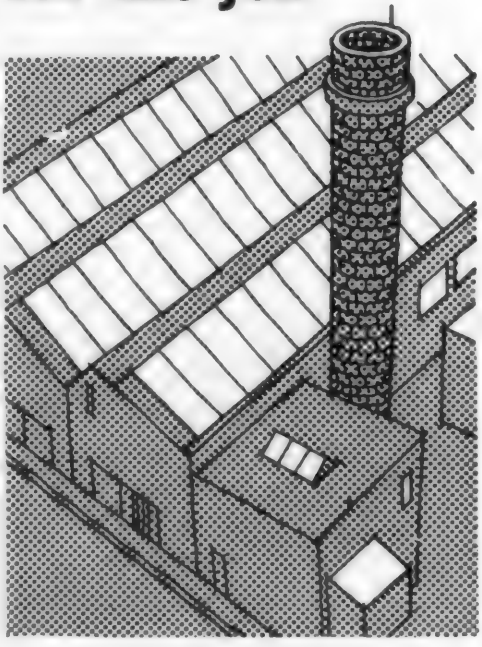
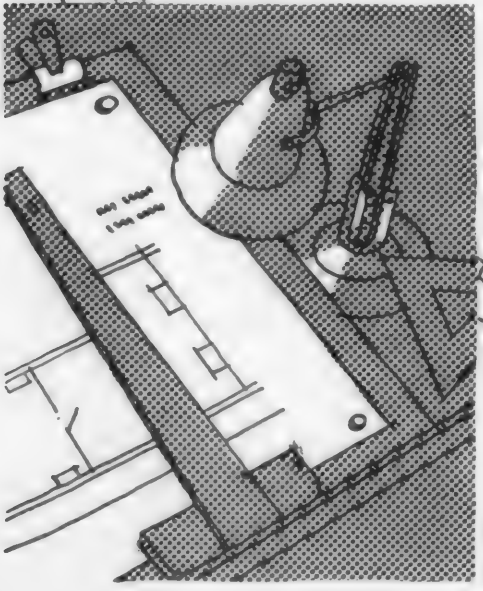


Every Jenner Conveyor is 'tailor made' for the job

From ingredients to packaged product untouched by hand and twice as fast. That's the beauty of Jenner conveyors. They do all the handling, for a smaller 'wage,' *and* free labour for more productive tasks. Jenner conveyors cut out manual handling, keep ingredients cleaner, never spill or tread them into the floor. There's no waste with Jenner conveyors. They're made-to-measure to fit precisely the technique and layout of each factory.





JENNER CONVEYORS

KEEP THINGS MOVING

A. & C. JENNER LTD. Specialists in mechanical handling equipment

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ACACIA
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For over 100 years, we have been importing gums from the east in their natural form.

The experience we have gained, together with our modern grinding plant, enables us to maintain guaranteed standards.

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Guarantee of Purity

If you have to

GRIND IT, SIFT IT,

MIX IT *or* DRY IT

GARDNERS PROCESSING PLANT IS USED IN THE MANUFACTURE OF:

SELF RAISING FLOUR · BAKING POWDER · CUSTARD POWDER SUGARS · CAKE POWDER · ICE CREAM POWDERS · CREAMS OILS · THIN PASTES · INFANT FOODS, etc., as well as a wide range of toilet and chemical products.

It might be a standard Gardner grinder, mixer, sifter or dryer. You have Britain's widest range of machines to choose from. Or it might need some special features to suit your process. It might even have to be a special job entirely. But you'll get the right machine from Gardners of Gloucester. Send in sample materials for a confidential test report and recommendations on the right machine for the job. It's the *quickest*, surest way to solve a processing problem.

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Telephone: Gloucester 21261 *Telegrams & Cables: 'Gardner, Gloucester*

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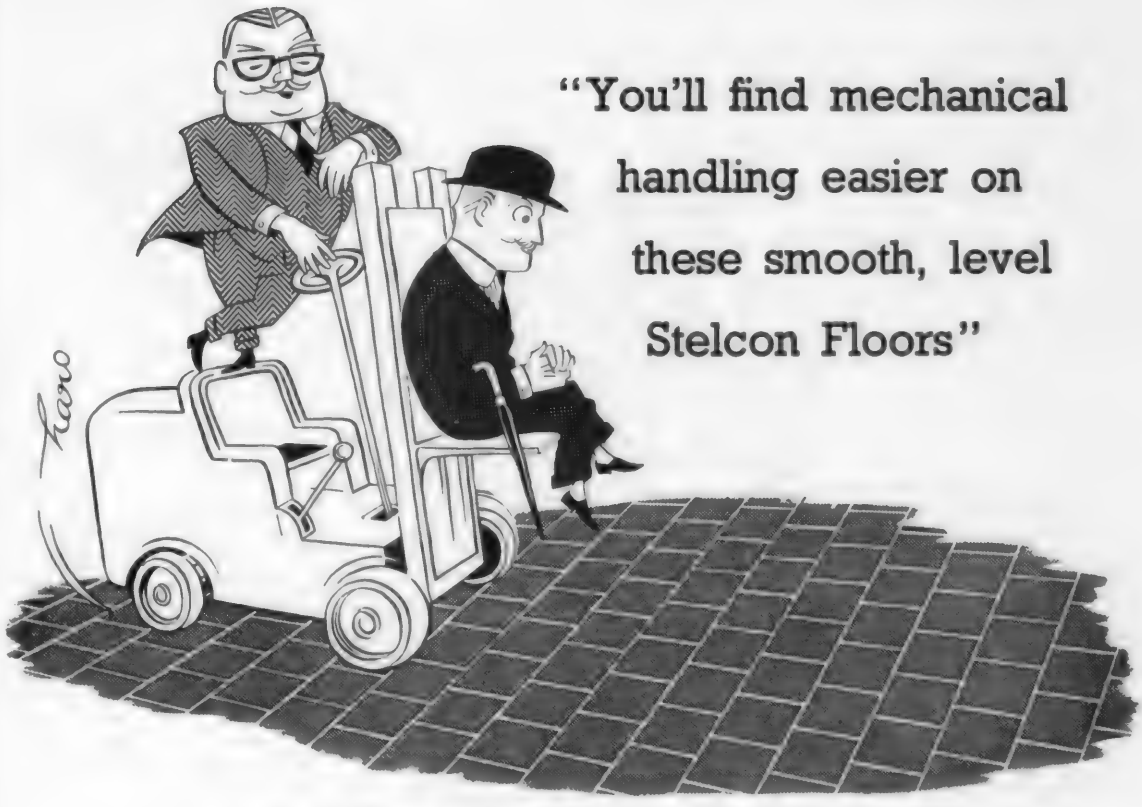

"You'll find mechanical handling easier on these smooth, level Stelcon Floors"

Modern mechanical handling works best when floors are smooth and even. You can carry maximum loads without mishap. That's why more and more industrial concerns are installing Stelcon Floors — they like things to run smoothly all the time.

Stelcon Anchor Steel Plates and Steel Clad Flags also provide dustless, hygienic floors of great strength and durability. Full details sent on request.

You'll find

Stelcon

FLOORS

in every industry — everywhere

To satisfy the requirements for a non-dusting, level surface, Stelcon Anchor Steel Plates were chosen for the floor of their new Strip Mill by Messrs. Firth Vickers Stainless Steels Ltd., Sheffield.

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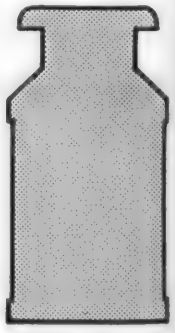
Home Produced Milk Powders,

Separated and Full Cream, Spray and Roller process.

Condensed Milk (28 lb., 56 lb. & 5 cwt.) Full Cream and Skimmed.

Evaporated Milk (Gallon Cans).



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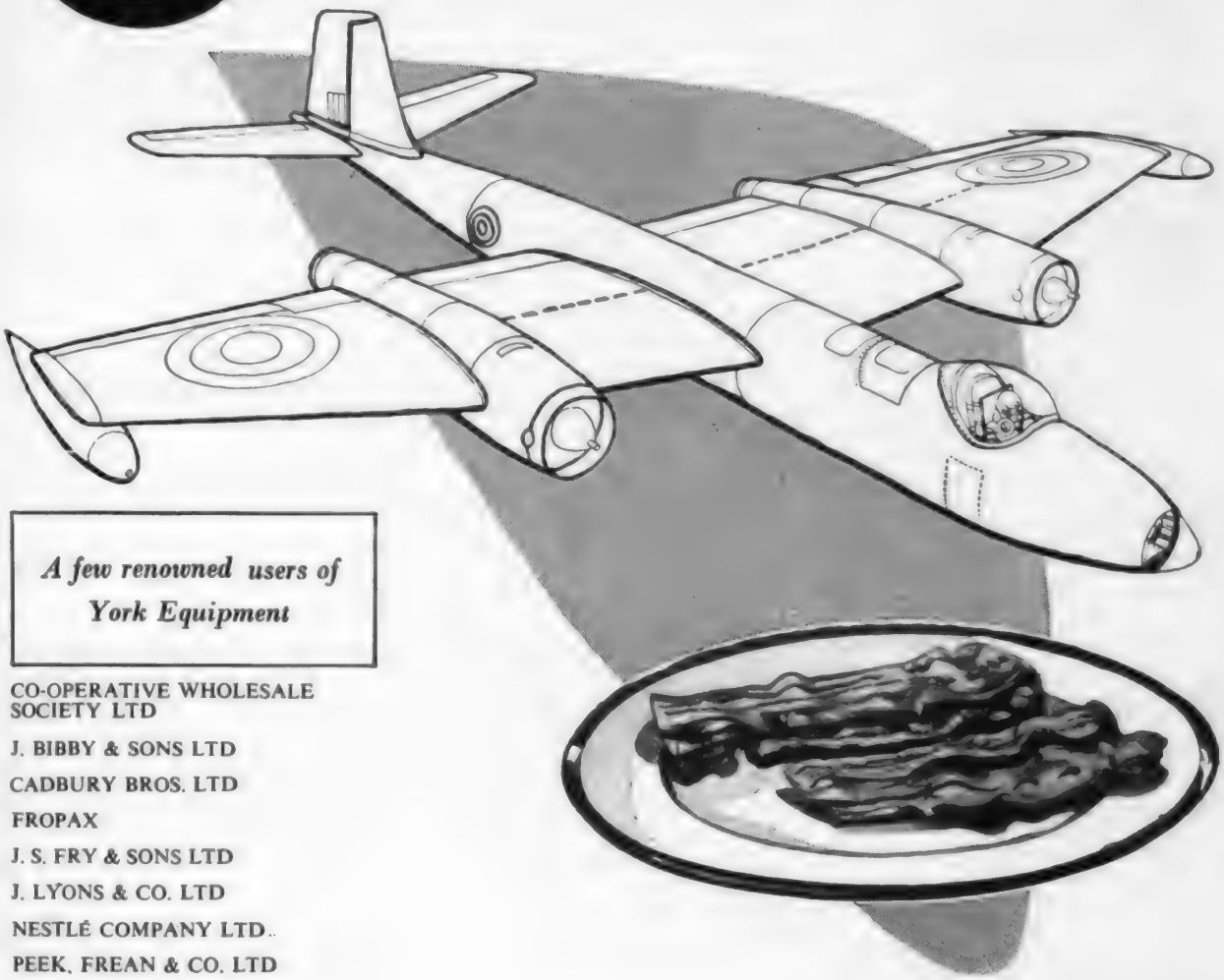
york refrigeration air conditioning

REFRIGERATION AN INTEGRAL PART OF MODERN LIFE



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J. BIBBY & SONS LTD
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Many widely dissimilar but equally important projects depend upon YORK refrigeration; sometimes in the heavy industrial range; at others in fractional horsepower size; but *all* having that quality which one might expect from the World's largest organisation solely devoted to the manufacture and distribution of industrial and commercial refrigerating and air-conditioning equipment.

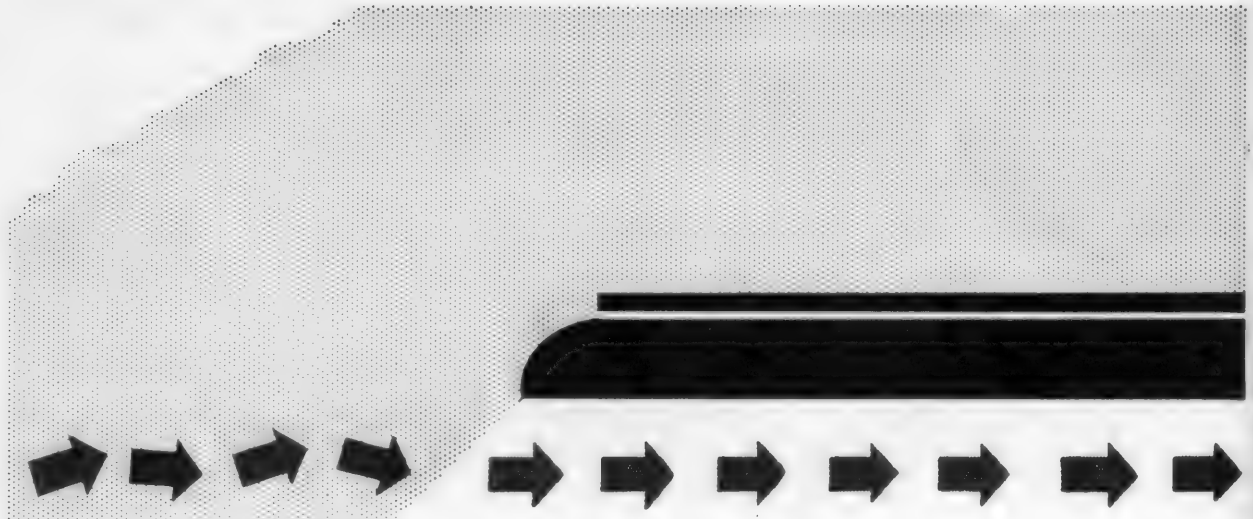
The manufacture of armaments to defend our way of living, and the preservation of food to sustain life itself, both demand standards of reliability and performance which YORK has proudly supplied. If refrigeration might solve *your* problem, have a talk with YORK.

york refrigeration air conditioning

YORK SHIPLEY LIMITED, NORTH CIRCULAR ROAD, LONDON N.W.2

Birmingham · Dublin · Glasgow · Manchester · Nottingham

Associated Companies, Branches and Distributors throughout the world.



Better Lighting—
Better Production

What is the lighting in your factory like? Have you recently checked the lighting level round the works with a light meter?

The *right* lighting has a significant effect on the speed and accuracy of production. When its strength, position and type is suitable for each job the craftsman can give full play to his skill, and the works engineer can do full justice to his shop.

Good lighting is only one of the many ways in which electricity is playing a vital part in the drive for higher productivity.

Electricity for Productivity

Ask your ELECTRICITY BOARD for advice and information, or get in touch with E.D.A. They can lend you, without charge, films about the uses of electricity in industry. E.D.A. are also publishing a series of books on Electricity and Productivity. Titles now available are: Electric Motors and Controls, Higher Production, Lighting in Industry, Materials Handling, and Resistance Heating. Price 8/6, or 9/- post free.

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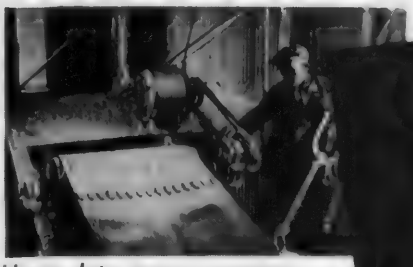
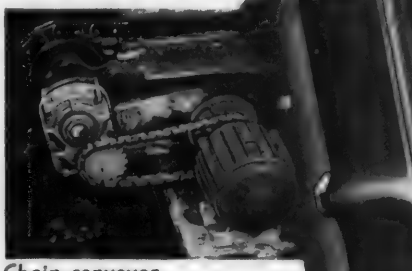
TWO NEW SIZES TO 30 H.P.

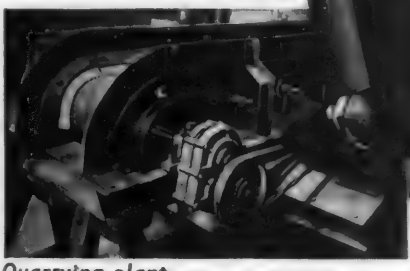


Heavy duty quarry conveyor.

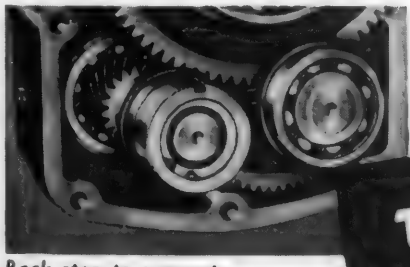
Paint and ink mixer.



Chain conveyor.



Quarrying plant.



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THE SHAFT MOUNTED UNIT WHICH REDUCES SPEEDS and COSTS

SIMPLE TO INSTALL
Cuts out foundations, baseplate, couplings and difficulties of accurate alignment.

LIGHT IN WEIGHT
Soundly constructed, but light in weight, obviating excessive load on the driven shaft and bearings.

READILY AVAILABLE
In stock at all the 18 Fenner Branches.

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THE LARGEST MANUFACTURERS OF V-BELT DRIVES IN THE COMMONWEALTH

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PURE VEGETABLE CHOCOLATE COLOUR

EXTRA CONCENTRATED

This colour is guaranteed to be entirely natural and free from any artificial or aniline dye. This is the strongest, richest and most economical preparation of its kind, and is very stable under high temperature.

Recommended for: **FONDANT, ICING, SWISS ROLLS, SPONGES, Etc.**

A Natural Product in a form which can be easily and conveniently and economically used by our customers.

We are specialists in this field and for full details of our Range of Natural Colours, write:

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Batch control for a liquid mix nowadays requires precise amounts of several ingredients to be dispensed in exact quantities. Too often this job still depends on a man with a bucket and a mind of his own. MEASUREMENT have replaced this uncertain method with a system of metered control. The quantities are pre-set on a dialled control panel and supplied to the mix, from a remote control point if necessary, at the press of a button. Quantities are precise, records are automatic, control is complete and the bucket is out.

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TABLETS—FOR SIMPLE PREPARATION OF SMALL VOLUMES

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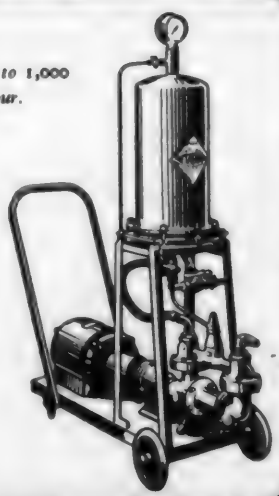
Sizes from 1 to 1,000 gallons per hour.



However carefully food products are prepared the customers' standard of perfection is appearance.
The scintillating clarity of Meta-filtered fruit juices, syrups, mineral waters, vinegars, etc., is the hall-mark of purity.

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THE METAFILTRATION COMPANY LIMITED, BELGRAVE ROAD, HOUNSLOW MIDDLESEX

No. 1 of a series of 6 advertisements

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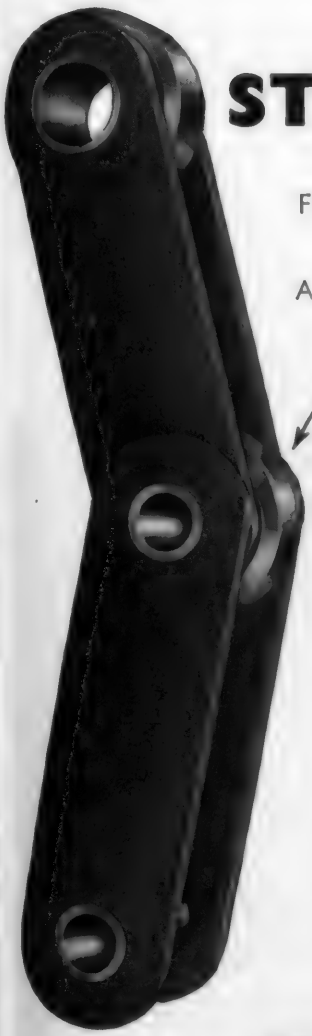
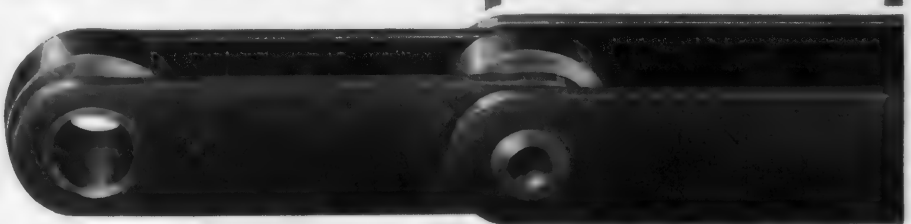


*HOLLOW BEARING PIN CHAIN



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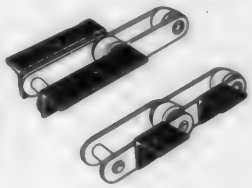
STOCK RANGE of chains and wheels up to 15,000 lb. breaking load. Range of attachments available, as illustrated, for fitting to basic chains at intervals as required.

'K' ATTACHMENTS



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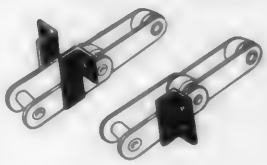
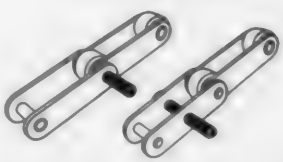
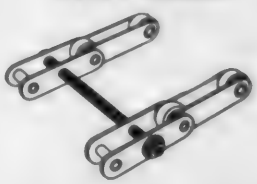


SPIGOT PINS



STAY BARS



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Transmission and Conveying Chains, Wheels and Accessories for all mechanical purposes.

VITAMIN A
VITAMIN D

- Vitamin master-mixes for margarine manufacture.
- Carotene mixes for vitaminisation and colouring.
- Synthetic vitamin A and D blends for the food and pharmaceutical industries.
- Natural vitamin A and D oils and concentrates.

BLENDS OF ANY POTENCY CAN BE SUPPLIED, IN BULK OR IN CONTAINERS EACH HOLDING SUFFICIENT FOR ONE BATCH OF USER'S PRODUCT

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Pneumatic and Electrical systems
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Temperature, Pressure, Humidity, etc.

Contract, panels and installation service available.

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Their Management in Great Britain
by Jack Hampton

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SCANDURA P.V.C. belting

helps the food industry

Cake packing on a 'Motaveyor' (by courtesy of Knightsbridge Cake Limited, Manchester)

Fruit bottling on a 'Motaveyor' conveyor (by courtesy of J. Mawdsley Ltd., Wigan)

Scandura conveyor in a fish canning factory (by courtesy of Fisher & Ludlow Ltd., Birmingham)

As the pioneers of P.V.C. covered conveyor belting British Belting & Asbestos have supplied their SCANDURA belting for many varied applications. Due to its resistance to contamination and its hygienic qualities SCANDURA has become the obvious choice for food conveyor belting. Its lasting qualities had already been proved in food factories two years before its first introduction in Britain's coal mines in 1948, and its fire resistant properties have brought a hitherto unknown safety margin where conveyor fire hazards originally existed. SCANDURA is available now, in varying widths and thicknesses to suit all applications.

SCANDURA P.V.C. BELTING IS MANUFACTURED BY **BBA**

BRITISH BELTING & ASBESTOS LIMITED · CLECKHEATON · YORKSHIRE

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Thomas Wall & Son's factory at Godley,
Semtex Limited installed
160,000 acid resisting paviors in the
floors of this building, using
80 tons of Furane Resin Cement.
Furane Resin Cement was also used
in the gulleys, drain channels
and the coving round the
perimeter.

Approximately 45,000 square feet of 9″ x 4½″ x 2″ Paviors were used for the flooring in this new factory—an installation which is just one of the many commissions entrusted to Semtex. If you have any corrosion problems in your plant, get in touch with Semtex Ltd., specialists in corrosion resistance. Its experts are at your disposal, and will advise—without obligation—upon the appropriate treatments.

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FOOD MANUFACTURE

Vol. XXXI. No. 1 · Published Monthly · January 1, 1956

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Published by Leonard Hill Limited, Stratford House, Eden Street, London, N.W.1.
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FOOD MANUFACTURE

Vol. XXXI, No. 1 January 1, 1956

Future food standards

REVIEWING developments in food and drugs administration before the Sanitary Inspectors' Association recently, the chief sanitary inspector of Watford, Mr. K. H. Marsden, gave a useful summary of the Food and Drugs (Consolidation) Act, 1955, which came into force today. The 1938 Food and Drugs Act came into operation a month after the outbreak of war—a very bad start since the peacetime administrative machinery was inevitably severely disrupted. A spate of emergency laws followed, including the amendment of 1944 which gave the Minister of Agriculture enhanced powers of control over the purity of milk supplies, and the Food and Drugs (Amendment) Act, 1954. The new Act should bring some much needed clarification to the legislation surrounding food hygiene.

"Alarm in informed quarters" is reported by Mr. Marsden at the extent to which chemicals are added to food today—scientific manipulation is the rule more than the exception, he says. In the U.S. the Delaney Committee has estimated that 704 chemicals are now used in foodstuffs and that of these only 428 are definitely known to be safe, while more recently the Food Standards Committee drew attention to the 79 chemicals used in this country as food colours and the consequent need for stringent control.

Although it prohibited the addition of injurious substances to food, the 1938 Act could not keep pace with the developments made during the war when, owing to severe shortages, food manufacturers made extensive experiments with food substitutes, extenders, improvers and preservatives. Emergency laws were passed to control their use, and Mr. Marsden welcomes their inclusion as a permanent feature of the new Act which, incidentally, also empowers the Minister to require fortification of certain foods, such as the addition of vitamins to margarine. He hopefully anticipates a flow of regulations prescribing further food standards. The probable cumulative ill-effect on consumers of additives will also be taken into account.

Orders made on the labelling and advertising of food are to be continued in force by the Consolidation Act, and here Mr. Marsden congratulates the law on being abreast of the problem, though he is critical of the decision to discontinue the labelling advisory service of the Food Standards Division of the Ministry of Food. During its lifetime this service reviewed over 100,000 labels to the benefit of food manufacturers and the public alike. Had it still been in existence, he says, the problem which has arisen over the labelling of "Fresh Orange Drink" would have been settled long ago. The revival of this service is strongly urged.

How much meat in a meat pie?

How much meat is there in a meat pie? The question is discussed by Mr. J. F. Anderson, chief sanitary inspector of Edinburgh, in his annual report. There is no statutory standard for meat pies, but the wide variation in the percentage of meat content points to the need for a prescribed standard, he says.

As small meat pies costing from 5d. to 10d. each are a very popular article of food, a few samples were purchased to ascertain the amount of meat they contained. The actual meat content of the individual fillings was found to be 81, 85, 66, 52, 50, and 80%, but the meat content of the fillings in relation to the pie as a whole was only 25·11, 23·80, 18·48, 18·20, 16 and 15·20% respectively.

"While samples with 25% are generally acceptable, those with less than 20% meat are distinctly on the low side," says Mr. Anderson, and continues, "As has been found in the case of sausages, the price charged was no indication of the quality of the article."

Discussing food hygiene, Mr. Anderson urges that, as in the case of the ice-cream and milk industries, where educational efforts failed to achieve adequate hygienic standards, local authorities should be equipped with legislative control to ensure minimum safe standards in all food establishments. Much stress has been laid upon the washing of hands in the training and education of children in the prevention of food poisoning.

One aspect of personal cleanliness raised by Mr. Anderson has wide implications. He points out that since 87% of the sub-standard houses in Edinburgh are without a bathroom, it appears that much food

labour may be drawn from homes devoid of such essential amenities as baths, wash basins, and hot water supplies. Edinburgh is not the only city or town with many citizens living in homes devoid of adequate washing facilities. The campaign for food hygiene must inevitably be impeded while such conditions remain.

An increase in food poisoning

THE made-up meat dish was the principal cause of the increase in food poisoning reported by the Chief Medical Officer of the Ministry of Health in his review of 1954 (H.M.S.O., 8s. 6d. net). The total number of food poisoning cases during the year was 6,016, 14% more than in 1953. Meat pies, reheated meat, pressed meat, brawn, stews, cold meat, sausages and sandwiches were mentioned in 68% of the outbreaks traced to a single dish. Rapid cooling, followed by proper refrigeration of meat dishes, would almost eliminate poisoning caused by *clostridia*. Similarly, prompt attention to minor injuries on the hands of food handlers and the use of the "no touch" technique in the handling of cooked meat dishes would prevent staphylococcal food poisoning.

The report points out that frozen liquid egg has recently come into prominence as a vehicle of organisms, mostly *salmonellæ*, associated with intestinal disorders. Indeed, the issue of the report almost coincided with the publication of a paper in the *British Medical Journal* (1955 (4951) 1296) describing outbreaks in two bakeries of paratyphoid fever associated with Chinese frozen whole egg used for imitation cream filling. The Ministry of Health report concedes that the matter bristles with difficulties of production, transport, manufacture and storage. It has been found that much contamination comes from the outer surfaces of egg shells so that cleaning before breaking them would greatly reduce the bacterial content of the shelled egg. Duck eggs are notorious carriers of *salmonellæ*, the organisms being found inside the egg themselves, and they are frequently mixed with hens' eggs, in which *salmonellæ* contamination is rare, so that the mix becomes contaminated from within. Using separate containers up to the finished product would help a great deal in simplifying manufacture. Rapid freezing of the shelled egg would prevent the multiplication of any organisms present, while restricting the use of the finished product to the manufacture of foods requiring adequate cooking would further reduce the risk.

As regards imitation cream made from eggs, it has already been suggested that hydrogen peroxide should be employed to prevent the growth of pathogens that may gain access to the cream (Hobbs and Smith, *J. Hyg. (Lond.)*, 1954, **52**, 230).

Green rot in eggs

"GREEN ROT" in eggs can be detected automatically in its early stages by an electronic device developed by the U.S. Department of Agriculture. Green rot is caused by *Proteus* and *Pseudomonas* bacteria, the latter being the most troublesome organism in cold stored eggs and undetectable by ordinary candling. The infection is called green rot because under ultraviolet light the infected albumen fluoresces green. The electronic spotter developed by the U.S.D.A. passes U.V. rays through the egg and measures the green colour wave-length.

The egg is illuminated by a mercury-arc lamp filtered to eliminate light of wavelengths longer than 500 mμ. The light of these wavelengths must be eliminated from the source to prevent interference with the detection of fluorescence. The light given off by the egg is measured through narrow-band filters peaked at 490 and 510 mμ. The ratio of the intensity of the fluorescent light passed by these two filters indicates the presence or absence of infection. The device is set up in conjunction with an egg conveyor belt and could work at the maximum safe speed of handling, namely 500 eggs per min.

Second thoughts on algæ

THE idea that algæ are efficient producers of food and other products has been exploded by Dr. Norman W. Pirie, F.R.S., of Rothamsted. Dr. Pirie, who was addressing the world symposium on solar energy at the University of Arizona, was supported by Dr. Paul Mangelsdorf of the Harvard University biological laboratories.

The single-celled algæ, says Dr. Pirie, are no more efficient at photosynthesis than the higher plants when grown under comparable conditions. Claims made on their behalf are based on comparisons of algæ grown under the most pampered and sophisticated conditions with standard farming practice that is essentially that of the paleolithic man.

Citing the case of sugar beet to prove his point, he pointed out that during its growth this plant accumulates dry matter at the rate of 24 tons per acre per year in the sub-optimal climatic conditions of Rothamsted. Under better conditions the actual growth in a year of plants such as sugar cane and bamboo can be more than 40 tons per acre. In his view, these are the only periods comparable with the short-term algal experiments.

To grow algæ intensively, Dr. Pirie added, the whole area has to be covered with transparent tubes or tanks interspersed with pumps to maintain movement, devices to feed in carbon dioxide and other nutrients and centrifuges to collect the product. This is all very well for a few square yards. "On the

scale of hundreds of acres," said Dr. Pirie in a splendid understatement, "the higher plant seems to offer economic and æsthetic advantages."

Arguing the case for improving the production of the principal food plants, Dr. Mangelsdorf reminded the symposium that of about a third of a million species of plants in the world, man has made use of some 3,000 different species for food, of which only about 150 have become sufficiently important to enter world commerce and only about 12 are used to feed the majority of the world's population. Actually, he pointed out, about 60% of the world's peoples obtain about 80% of their food from a single species, the rice plant which, therefore, accounts for approximately half of the human energy in the entire globe.

Mechanical menaces

NINETEEN years have passed since suppliers of mechanically operated machines for use in factories were placed under an obligation to fence certain dangerous parts, but, according to the report of the Chief Inspector of Factories for 1954 (H.M.S.O., 8s. net), compliance with this law is still far from complete. During that year 800 machines were reported as being deficient in guards, many of them in the food industries.

A particularly dangerous machine is the worm-type meat-mincer for which the standard advocated for many years has been a feed opening not more than 2⅛-in. dia. situated not less than 5-in. from the worm. Some post-war machines—particularly those from the Continent—do not come up to this standard. The problem has been to provide guards for very large machines handling several tons per hour without reducing the mincing capacity. The solution adopted is to fit a fixed guard over the hopper top while the meat is fed into the machine by a side entry situated far enough from the worm to prevent access by the fingers. The "swan neck" hopper type of dough divider guard was found effective on one British machine. Another danger with large meat mincing machines is the end plate, often containing perforations large enough to take a finger tip. Where this is the case, the report recommends some form of discharge chute which can usually be fitted to existing machines without difficulty.

Pie-making machines have often caused accidents, and one reason for this is that safety features have not been incorporated into the machines to make practicable the provision of effective guards. False tables are being provided by two manufacturers on which guards can be provided, preventing access to the plungers. Another maker, who has real practical difficulty in providing tables, proposes to extend and modify the existing sensitive guards designed to stop the machine if a hand reaches into danger. The electrical arrangements associated with trip guards are still a problem. One type of guard operating limit switches which are pushed in or pulled out, can be defeated if the operator opens and manually operates both switches. Experiments are being made to replace this system with a positively controlled switch. Experiments are also being made on a brake or similar device to prevent accidents due to over-run movement.

Down the drain

"NEVER throw money down the drain," advised the chief chemist of the Bolton Sewerage Board when reading a paper on "Trade Effluents and Sewage Disposal" to the Incorporated Plant Engineers. Whether his effluent is being discharged to the public sewer or to a water-course, the factory owner should first and foremost ensure that nothing is being wasted in the liquor which might be economically recovered for sale or re-use.

Most of the food industry's effluents are organic materials which will putrefy, and if discharged to a river would use up the dissolved oxygen, killing off the river life and creating a public nuisance. The more useful material that can be prevented from going down the drain the lower will be the cost of sewage treatment. An example of this saving is in dairies where improved churn emptying facilities have both increased the output and correspondingly reduced the load. In America, the Campbell Soup Co. has installed a dehydrating system to take care of the solid wastes at one of its tomato canneries and sells the dried products. Liquid wastes are disposed of by spray irrigation.

Another related problem is that of controlling offensive smells from factory processes. A recently developed process for the removal of odours is reported to have been highly successful at a small potato crisp factory situated in a cul-de-sac, which had been the subject of continuous complaints in spite of such measures as canopying the fryers, dispersing the steam through stacks, etc. The odour was completely eliminated, according to Ronald Williams (*Municipal Jnl.*, 1955 (3265), p. 2483), with only a small initial cost and operating expenses of £3 per week.

The system consists of a simple mechanism which sprays a special liquid to be mixed with the odours to alter them before discharge. It is based on a principle discovered about 50 years ago by Zwaardemaker, who found that when two perceptible odours were mixed together in the required proportions, no resultant odour could be noticed. The original work was developed to a point where there are now some 90 formulæ, each designed to counteract specific odours.

Preservation by antibiotics

THE USE of antibiotics as food preservatives has hitherto been somewhat speculative. Since the first International Conference on the Use of Antibiotics in Agriculture, more definite opinions can be formed. At the conference, held recently in Washington, the United States Secretary for Agriculture expressed a definite measure of confidence in this method of food preservation by saying that "studies of this nature are essential and must be carried forward in full."

Dr. F. E. Deatherage of Ohio University said there was no doubt that a combination of antibiotics and refrigeration could do more for preserving perishable foods than either means alone, and where refrigeration facilities were limited or absent the use of antibiotics could prolong the keeping qualities of some foods to permit more efficient distribution.

If carcasses are infused with suitable antibiotics immediately after slaughter, internal spoilage is significantly delayed. Even when carcasses are chilled at once after slaughter, meat is still a dangerously perishable foodstuff during its distribution. Using antibiotics as well could revolutionise meat distribution, allowing time for all cutting and packaging to be conducted at the initial point. This would mean that the retailer received consumer-packaged cuts.

Hens fed with aureomycin in their feed produced eggs whose yolks remained bacterially free for as long as 55 hr. at 88°F. Feeding poultry and pigs with high-level doses of antibiotics shortly before killing had resulted in their meat keeping longer. Additions of antibiotics to unrefrigerated milk had inhibited bacterial growth for 48 hr. Canadian work, reported by Dr. H. L. A. Tarr of the Pacific Fisheries Experiment Station, Vancouver, has shown that tiny amounts of aureomycin, added in chipped ice or in chilled sea water, would keep fish in fresh condition twice as long as ordinary refrigeration. This new method for retaining fish freshness is inexpensive. This Canadian work began in 1943, using penicillin; its prospects were greatly improved when aureomycin was discovered, for aureomycin seemed to be five times as effective as any other antibiotic preservative. We shall shortly be publishing more details of this work in an article which Dr. Tarr has written especially for FOOD MANUFACTURE.

Antibiotics suitable for food preservation, including aureomycin and terramycin, are now all available from manufacturers in this country.

A night at the Palace

ADVERTISING is the art of the unexpected, and it is not always the newest techniques that are most successful. Commercial television has put at the advertiser's disposal the latest form of electronic entertainment. But credit for the most original promotional idea for many a day must surely go to a firm of millers who have brilliantly harnessed to their publicity drive one of the oldest forms of entertainment—the music hall. J. W. French and Co., Ltd., took over for a week the Palace Theatre in the centre of Manchester and invited the public to spend a free night at the Palace. To get a ticket all that was necessary was to present at the box office the firm's trade mark cut from a 3 lb. bag of flour, costing 1s. 7½d, which, incidentally, had to be bought at the grocers. The idea was immediately and immensely popular, and a special Saturday matinée had to be arranged in addition to the normal twice-nightly show. The only "commercial" in the show was an instructive 10 minute cookery lesson.

Food flashes

FOR the food industry, 1955 was the first completely unrestricted year since 1938. This circumstance, allied to an exceptionally good summer, brought good profits to nearly all manufacturers. Biscuits, frozen and canned products, butter and many other foods enjoyed record sales. Jam manufacturers were among the few to suffer—casualties in an age of full employment when everybody is too busy for tea-time.

The year brought more records than the highest profits known to most food manufacturers. In America, stevioside "the sweetest substance on earth" was announced and Georgi Malenkov was elected the Man in the Biggest Pickle. Baby foods enjoyed a boom and "senior foods" made their début. In Britain, changes in the national diet were reported by the National Food Survey Committee and Lord Chief Justice Goddard opined that many people enjoy eating string with sausages.

In China and Japan a tendency to turn from rice to bread was noted—a tendency strong enough to lead the Japanese ambassador to Canada to forecast that in 20 years his country would replace Britain as Canada's largest wheat buyer.

France, unbowed by the efforts of one of her numerous prime ministers to root out alcoholism, named a cocktail (based on cream) after M. Mendès-France and sent the Jurade de St. Emilion to London to select four English wine peers at a ceremony solemn with medieval pageantry. Although the Jurade no longer burns the wines which it disapproves of, nor puts those responsible for them into chains, no one dared mention canned wines to them.

Much was said and written about nuclear energy and attempts were continued to persuade food manufacturers of the advantages of radiation sterilisation. The expression "hot potato" has, therefore, taken on quite a new meaning.

Yes, 1955 was a remarkable year in many ways. And now for the trials and triumphs of 1956.

Meat Products for the Masses

Wall's Challenge the Northern Market

The great expansion in the meat products and sausage side of their business has made Wall's as famous in the South for these goods as for their ice-cream. Applying the same successful technique of scrupulously hygienic large-scale production, their new Godley factory—the second largest of its kind in Britain—aims to provide Northern customers with all the sausages, meat pies and cooked meats they can buy.

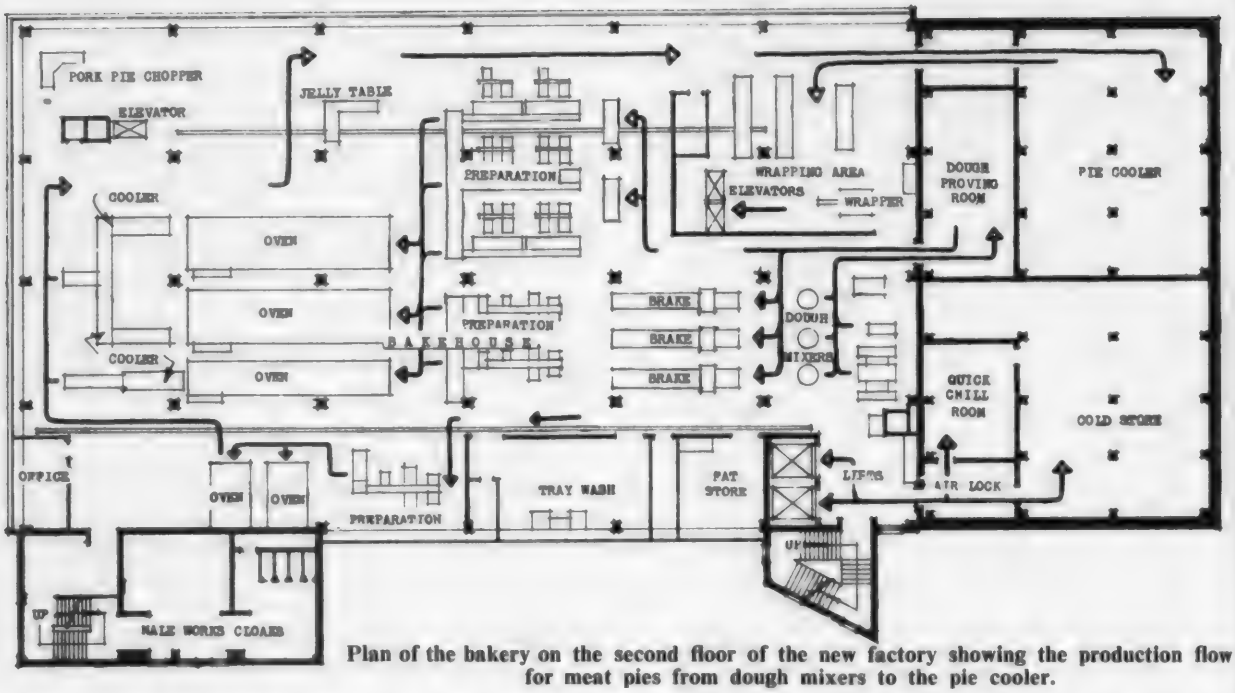
ECLIPSED in size only by their own London plant, Wall's new meat products factory at Godley, Cheshire, is the spearhead of their bid for the Northern mass markets. Up till now only a limited distribution of their meat products has been made in this area from the very small meat department established in Godley after the war. However, as the chairman, Mr. Cecil W. Rodd, remarked at the opening of the factory, Wall's see no reason why they should not be as successful in providing quality meat products in the North as they have been in the South. The new factory will employ 700 men and women to produce about 350 tons of meat products weekly, of which 220 tons will be sausages, 100 tons bakery products and 30 tons cooked sausages and cooked meats. Embodying features evolved by Wall's 170 years of experience, the new factory contains a complicated system of air-conditioning and refrigeration services, three different types of conveyor systems, brine and ammonia lines, steam, hot, cold and chilled water, yet the basic construction principle is one of the simplest ever devised. The whole factory was built in 18 months.

The building is in three main parts—production floors, cold storage and personnel and welfare—all under the same roof. The production section is on four main floors. The ground floor houses cold stores, raw materials and meat reception rooms, factory offices and the quality control staff, finished goods stores, utensil washing facilities and the dispatch department. The meat preparation department is on the first floor, the bakery on the second and the sausage department on the third. An area for the manufacture of cooked sausages and cooked meats is also included on the first floor.

The cold stores have facilities for blast freezing and long-term cold storage as well as holding rooms for the overnight storage of raw materials. The high temperature rooms include a meat-chilling room; a kitchen chill room for dealing with processed meat; a brine-salting room containing storage vats and brine-cooling equipment; a cooling room for various types and sizes of pies; a chill room for pre-cooling sausage meat; refrigerated brine for air-circulated sausage coolers, a chilled water plant for use in sausage production; a sausage finished goods store, a pie finished goods store and a dough-prover room. The low temperature facilities include a meat freezing and storage room and a sausage freezing room. The whole block is laid out so that the rooms lie adjacent to the appropriate manufacturing areas.

Above: **Trolleys swing from monorails. These small pies are on their way to the finished goods store.**

Great attention has been paid to hygiene. Ceilings throughout the factory have been painted with mould-inhibiting paint and treated to prevent condensation. Electric lights (most of them fluorescent) are protected by *Perspex* shields so that should they break glass will not enter the food being pre-



Plan of the bakery on the second floor of the new factory showing the production flow for meat pies from dough mixers to the pie cooler.

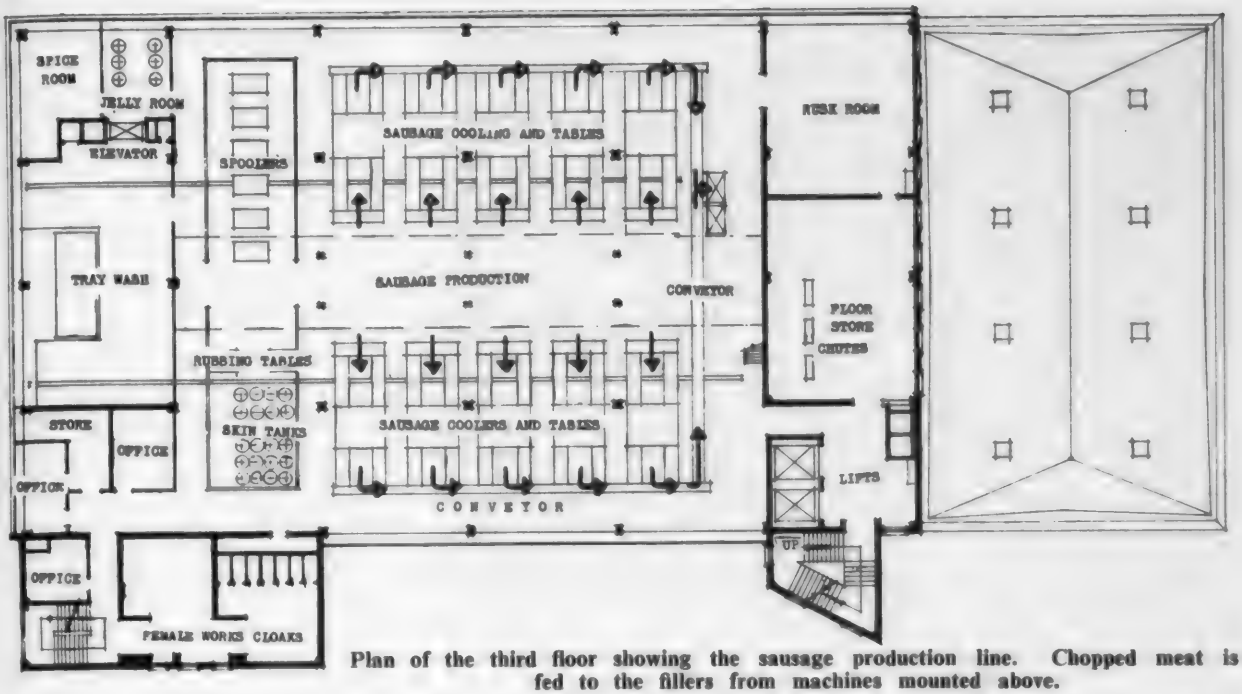
pared below. Walls in the production areas are faced with blue-grey glazed tiles to a height of 7 ft. and finished above with ivory-coloured cement glaze. Partitions are of glass and steel. The non-slip floors are paved with brick paviors set to fall into drainage channels and proofed against water, steam, fats, etc., by setting them in furane cement. All floor drainage is directed into a fat interceptor at the northern end of the building arranged in parallel tanks so that alternative parts may be cleaned without stopping the flow of liquid to the drains.

Almost clinical cleanliness is insisted upon among the factory staff. White caps and overalls are provided where necessary and are laundered and changed frequently. Hospital-style taps, operated by the elbow, are provided in the changing rooms, while the medical service, consisting of a full-time doctor, trained nurses and an assistant, attend to the slightest cut or abrasion.

Meat handling

Lorries laden with meat are drawn up alongside the loading bay and the carcasses are swung up directly from the tailboards on to overhead rails. After being automatically weighed on heavy capacity dormant scales, they are pushed into the appropriate cold stores for subsequent transfer to the carcass elevator. Overhead track scales check individual carcasses into the various meat stores and out of the stores into the butchery departments. The dual use of these scales enables a close check to be kept on losses through evaporation and other causes during storage. When the carcasses are required either on the meat preparation floor or in other chill rooms, they are pushed on to one of the lifts, also fitted with rails. The sides of meat can later be moved direct from the lift on to other rails in the meat production department and so to either the boners or to other sections of the cold store. A section has been set aside on this floor for the quick thawing of carcasses, which enables meat which has been hard-

Rolling the dough for small pies in one of the dough brakes.



Plan of the third floor showing the sausage production line. Chopped meat is fed to the fillers from machines mounted above.

frozen to be de-frosted with the minimum of loss.

Meat pies

Preparation work on all the different types of meat is carried out by trained butchers on the first floor. Pork is boned out (70 boners are employed), beef and mutton minced and the materials are weighed up, mixed and blended according to the appropriate recipe before they are dispatched to the manufacturing departments. Cooked meats and cooked sausages are also made on the first floor in a section known as the "kitchen," provided with steam extraction equipment and stainless steel boilers.

Meat pies and other bakery products are made on the next floor. Flour used in this department is stored in a room above the main bakery and shot down into the mixing area. After being rolled in the dough brakes, the dough for small meat pies is moulded automatically into tins, filled with the prepared meat and conveyed into one of three 42-ft. gas-fired travelling ovens. After baking, small pies are packed by an air-operated machine blowing open the cellulose film bags which are filled by girls and later heat-sealed. Larger pies, such as the 1-lb. raised pork pie, are fed into automatic wrapping machines. Overhead monorails and roller conveyors are used to carry both pastry and meat in this department both during the course of preparation and to convey finished pies from the ovens. In fact about 5,000 ft. of monorails, carcass rails, elevators and conveyors are used in the factory. The baking department also has a small fitters' shop to deal with running repairs and the routine maintenance of machines.

Small pies are bagged by these machines and heat-sealed.

Sausages

Sausages, the bulk of the new factory's production, are made on the top floor. Trays of meat are conveyed by lift from the bottom floor into the chopping machines mounted on a gallery below the roof. The machines are also fed with rusk from a room immediately below the gallery and are connected to a chilled water

Sausage department, showing the cooling tunnels (*left*) and the moving belt on which the finished products are taken to the dispatch cold stores, three floors below.

supply. The meat is chopped on the gallery and then dropped into the hoppers of fillers immediately below on the main production floor. In the casings department, selected skins are spooled on to nozzles, fixed to the filling machines and the sausage meat extruded into them. Continuous sausage production at the rate of 1,500 lb. per hr. is possible with each of these filling machines which have been made for Wall's to their own designs, and which replace the batch type fillers usually used in sausage manufacture. The machines deliver the meat to the skin at a uniform rate so that all sausages are of uniform size. The units can be completely dismantled for sterilising within a few minutes without the use of special tools.

The cooling tunnels and driers installed in the sausage department were also made to the company's own design. After cooling and drying the sausages are checkweighed (they have been weighed in 1-lb. bundles on the production line), wrapped by girls and packed into aluminium crates perforated with ventilation holes. These are conveyed to the chill room.

Chill rooms in the dispatch department on the ground floor are connected to all production departments by elevator-conveyors. When ready for dispatch the goods are loaded by conveyor on to the vehicles. The vans return to the same area, while the containers in which their goods were issued are returned to another section of the dispatch department where a tray washing machine has been installed. After washing, the containers are transferred to the manufacturing departments by an elevator conveyor similar to that which brought the finished goods down into the chill room.

SOME SUPPLIERS OF EQUIPMENT

Anti-condensation ceiling—*C. and T. (Pyrock Contracts) Ltd.*
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Choppers—*J. C. Wetter and Co. Ltd.*
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Cooking temperature recorders—*Taylor-Short and Mason Ltd.*
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Sausage fillers—*Mono Pumps Ltd.*
Specialist flooring—*Semtex Ltd.*
Stainless steel and aluminium tanks, tablets, meat chutes, etc.—*Maitlands (Metal Works) Ltd*
Travelling ovens—*Spooner Food Machinery Engineering Co. Ltd.*
Tray washers—*R. Kellie and Sons Ltd.*

FAO's Food Balance Sheets

Frequent reference to constantly changing data is an arduous task, but is usually made easier when the data are conveniently presented. For this reason alone, the FAO are to be congratulated on their Food Balance Sheets,* a publication in loose-leaf form. The sheets are now being issued as a continuation of the series first issued in April 1949 which were discontinued owing to staff shortage soon after 1950. FAO have recommenced the series in response to requests from governments, scientific institutions and other bodies who want a comprehensive picture of the pattern of a country's food supply: the quantities and types of food produced, imported and exported; how their supplies are used for various food and non-food purposes and the quantities and types of food available for consumption by the human population both in actual amounts and in calories and nutrients.

The tables consist of columns showing production (including national production of all foodstuffs and estimates of home-grown supplies which do not enter commercial markets); changes in stocks; exports and imports; available supply; animal feed, giving the quantities fed to livestock; seed; manufacture; waste; gross quantities available to consumers; extraction rates which apply chiefly to cereals and which are used to effect a conversion of grain to flour, etc.; net quantities of food available for consumption, and the per caput consumption.

It has been recognised that the interest and value of the Food Balance Sheets could be increased if, in addition to the figures for calories and energy-yielding nutrients, similar data on important vitamins and minerals were presented, and FAO are considering the inclusion of this data. They warn that the sheets can never be more than an approximate measure of food supply and its disposal.

* *Food Balance Sheets.* 2nd Issue. 1955. FAO Rome, H.M. Stationery Office, London.

RECENT ADVANCES IN
Starch Chemistry and Manufacture–2

By Eric F. W. Dux, Ph.D., M.Sc., A.R.I.C.

In his first article, published last month, Dr. Dux reviewed modern ideas on the chemistry and manufacture of starch. He concludes with a survey of analytical methods, followed by a discussion of some problems which arise in the practical use of starch in food manufacture, e.g. discoloration, bread staling, the texture of blancmanges, and the manufacture of cold water-soluble pudding powders.

Developments in analysis

WHILE big advances have been made in starch chemistry recently, it is disappointing that no fast and reliable method for its assay has been developed, although the reliability of present methods is being continuously questioned.

Determination of starch in food products can be based either on the properties of the whole starch (non-hydrolytic methods), or the polysaccharide can be broken down to simple sugars which are then determined by classical methods (hydrolytic methods).

Usually, starch is quantitatively precipitated when an aqueous solution is poured into excess ethyl alcohol. This property has been the basis of a number of methods, such as that of the Association of Official Agricultural Chemists (U.S.A.). The original specification of McVey (1941) relating to starch in sausage meat was later adapted by Munsey (1951) to cereals, and by Steagall (1954) to flour and bread. In this method the food product is digested with potash to extract non-starch materials, neutralised with hydrochloric acid, filtered and the starch precipitated in alcohol. The precipitate is collected on a Gooch crucible, dried and weighed. The method is stated to be reliable in the presence of hemi-celluloses. It was shown by Samec that pressure-cooked starches no longer give a quantitative yield when precipitated in alcohol, and similar conclusions were recently drawn in respect of starches which had previously undergone treatment with alkali. The method of starch determination by precipitation in alcohol must therefore be applied with some caution.

Another non-hydrolytic method depends upon the very characteristic blue colour which starch forms with iodine, the intensity of the colour obtained under standard conditions being a measure of the starch content and lending itself to colorimetric determination. However, the method can only be applied if the amylopectin-amylose ratio of the starches to be determined is known to be constant. As it is only the amylose component which gives rise to the blue colour (amylopectin giving a reddish colour), any variation of the ratio of the components would render this method useless. If there is any doubt as to this point, the well-known method of potentiometric titration of starch with iodine would give the amylopectin: amylose ratio. A rapid colorimetric method for the determination of starch in apples has been described by Carter and Neubert,[1] in which a preliminary short digestion with 7·8N $HClO_4$ is followed by formation of the blue complex and its measurement. No doubt this method can be applied to other foodstuffs with little modification.

Starch may be hydrolysed to simple sugars in two distinct ways. Treatment with hot acid gives glucose in almost quantitative yield. A correction factor has to be applied, and it is usual to multiply the weight of glucose found by 0·9, to give the true starch content in the original material.

In the other method starch is hydrolysed with diastatic enzymes. This appears to be a more difficult way of determining starch, and this is illustrated by a collaborative study of the A.O.A.C. method undertaken by a number of chemists in 1954. Certain food products were analysed and the values for the starch content of cream crackers ranged from 40·4% to 58% and of bread from 53·4% to 68·7%.

Chromatography

It is on the final aspect of hydrolytic starch determination—the estimation of sugars—that interest has been centred recently. It used to be common for sugars to be determined by a copper solution (*e.g.* Fehling or Benedict), but chromatography has now completely changed the picture. The chief advantage of chromatography lies in the simplicity of the apparatus and the easy adaptation to the micro-scale. Paper chromatography, in particular, is of interest to food chemists, and the recent communication of Acker, Diemair and Pfeil,[2] which deals with the determination of carbohydrates in malt extracts, starch syrups, etc., gives many details. The product under investigation is dissolved in butanol-acetic acid-water (4:1:5), to the organic phase to which 20% methanol is added. After chromatography the position of individual sugars is found by developing a test strip, followed by elution by capillary action of the main portions and colorimetric determination with anthrone sulphuric acid. The method gives good results with 450 μ dry carbohydrates. In Hirst's original method the spots were extracted by suspending the paper at the base of a reflux con-

denser, followed by periodate oxidation and titration of formic acid with baryta. For everyday use this may be too cumbersome, and a recent paper by McCready and McComb[3] describes the quantitative determination of sugars on paper chromatograms by reflectance. This method obviates extraction of the spots. In practice, the spots are developed with a suitable reagent (*e.g.* aniline-trichloroacetic acid) followed by measurement of the reflection density, using light at 515 mμ. Consistent results were obtained when using 2-5 μl of sugar solution.

Another interesting method, which is particularly useful for quick examination of starch syrups, employs paper chromatography followed by development with ammoniacal silver nitrate. The paper is then rendered transparent with liquid paraffin and bromo-naphthalene, which makes possible the direct photometry of the black silver spots.

Chromatography of whole starch has centred mainly on separation of the components on a suitable column. Mullen and Pacsu succeeded in 1941 by using cellulose or activated carbon, both of which adsorbed amylose strongly. The adsorbate was washed free of amylopectin with cold water, amylose itself being removed by using hot water. Ulmann used a column of Brockmann alumina,[7] the top half of which was rendered acid to *p*H 4·5. After treatment with a dilute starch solution and development with iodine-potassium iodide reagent, the violet colour typical for amylopectin formed a fairly sharp zone near the top of the column, while amylose was shown up by a blue band in the lower, basic part of the column. This method is claimed to give information on the previous history of the starch, such as limited hydrolysis, enzymic action, etc.

Biological assay

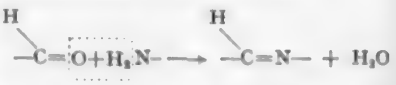
The biological assay of sugars still appears to be widely used. Here use is made of the removal of certain sugars by fermentation and subsequent determination of the remaining sugars. The method of Pan, Nicholson and Kolachov[4] may be mentioned, in which one particular yeast is used at various strictly controlled *p*H values. At any one such value only one sugar is fermented, for instance glucose at *p*H 9·3 and maltose at *p*H 4·8. In each case the remaining sugars are determined by the old-established method of Somogyi. Although Pan *et al.* obtain consistent results with yeasts of various origins and up to three weeks' old, Lindemann found that the rate of fermentation was dependent upon the source of baker's yeast used, and that in some instances the time for complete fermentation advised by Pan (90 min.) had to be increased to 5 hr.[5]

Another variation of the biochemical determination of sugars in starch hydrolysates is selective fermentation of groups of sugars by different yeasts. This method, developed by van Voorst,[6] employs two distinct yeasts which are allowed to act (*a*) independently and (*b*) jointly on a sugar mixture for 14 hr. under standard conditions. *Saccharomyces cerevisiæ* ferments only glucose and maltose, but not lactose and oligosaccharides. *Candida pseudotropicalis* ferments glucose and lactose, but not maltose. After each of the three fermentations the remaining sugars are determined with Luff's reagent. In the event of oligosaccharides or dextrins being present(such as in starch syrups), a sugar determination is carried out first. Another portion of the original mix is then hydrolysed and the solution once more fermented and the sugars determined. A mathematical calculation gives values for each of the sugars present. A mixture containing fructose, glucose, lactose, maltose, reducing and non-reducing dextrins may thus be resolved. This method has been adopted by many food laboratories.

Discoloration of food products

Many food products which contain starch or its hydrolysis products tend to discolour under certain conditions. This property is influenced in particular by heating, ageing and changes of *p*H. Sometimes the colour developed is desirable, as in the manufacture of breakfast cereals or beer. In other cases, such as dried foods, it is unwanted.

A distinction is made between the brown colour obtained during manufacture and the yellow colour which some food products develop when ageing. The difference arises as a result of two separate chemical reactions. The darker colour, usually obtained when heating starch syrups or sugars, is due to the Maillard reaction. Here, a Schiff's base is formed by the reaction of the carbonyl group contained in reducing sugars and a free amino-group in a protein (or any of its hydrolysis products). The initial products of the reaction are usually colourless, but soon condensation sets in and a brown discoloration is observed.



When heating is prolonged, further changes are observed. The amino-groups are no longer recoverable, a marked odour of caramel develops, the solution turns yellow-orange and then black. Finally CO_2 is evolved and a black precipitate settles out. The pigments produced during the reaction are called melanoidins and are complex polymers of reactive intermediates.

Native starches contain about 0·3% albumen, which is a sufficiently high proportion to cause discoloration with carbonyl groups. Whereas there are only a few of these latter groups in ordinary starch, hydrolytic breakdown during processing or dextrinisation by heat causes a progressive increase, thus giving rise to an ever-deepening colour. The Maillard reaction is not influenced by daylight nor does it cause any change in the U.V.-spectrum of the products.

U.V. examination of the yellow discoloration found in ageing starch syrups disclosed that it was due to the presence of 5-hydroxymethylfurfural (HMF). All starch syrups were found to contain

small amounts of this substance which is formed during the conversion of starch with mineral acid. Radiation with day or U.V. light induces a reaction between HMF and amino-groups contained in protein (or amino-acids), causing yellow discoloration. This reaction is quite distinct from the Maillard reaction, although the presence of amino-groups and another reactive group is essential to both.

For many purposes it is important to inhibit the discoloration of products containing sugars, and two distinct methods are available. In the first, SO_2 is added in small amounts, either as a gas or in the form of a solid sulphite. In this way a derivative of the familiar aldehyde-bisulphite addition compound is formed, which makes it impossible for the carbonyl group to combine with proteins to form a Schiff's base.

Removal of amino-groups by ion exchange

In the second method the offending amino-groups are removed from the starch or sugar product, thus eliminating the source of the trouble. The classical method, which is still used today, makes use of the decolorising properties of activated charcoal, and it is often necessary to pass a sugar or starch solution repeatedly through beds of charcoal. This method has now been superseded by the ion-exchange resins, which are more economical in use. In general, cation-exchange resins of the weakly acid type (such as those containing carboxyl groups) are used. These are particularly useful in the selective separation of single ions from a solution containing many other ions. The use of exchange resins in the manufacture of food products, based on starch or its degradation products, has resulted in the removal of all cations introduced by the starch and water, in addition to those from the acid used for conversion. More important than the removal of inorganic substances (including iron and copper) is the removal of organic impurities, such as amino-acids, HMF, lævulinic acid and hydroxymethylfuroic acid. It is usual to employ a series of resins for the complete removal of these impurities, and the usual sequence is: anion-cation-anion exchange resins contained in a battery of vertical columns. The use of these resins has saved space and fuel, improved plant cleanliness and, most important, made refining more efficient, thus improving both product quality and yield. When exhausted resins can be regenerated by the passage of soda (for cation exchangers) or acid (for anion exchangers), so that they have a practically limitless life.

A typical cation exchange resin used for decolorisation of starch syrups is *Zeo-Karb* 226, manufactured by the Permutit Co., London. This is a unifunctional, cross-linked methacrylic acid bead resin of high stability, containing only carboxyl groups as the ion active groups. The resin is used in the form of a vertical column and, when exhausted, may be regenerated with N/1 hydrochloric acid. For mixed bed demineralisation an anion exchange resin, such as *De-Acidite H* may be used in conjunction with the cation exchanger.

The efficiency of exchange resins in the removal of nitrogen-containing impurities can be checked by the candy test. Here, pure glucose is heated to 145°C. for 12 min. under standard conditions, and after solution in water and filtration, the colour is examined in a colorimeter. In practice, the colour developed by the sugar under investigation is compared to that obtained with pure glucose. Generally it seems desirable to reduce the nitrogen content below 3 mg.% on dry matter, in order to avoid serious discoloration.

Staling of bread

Although the exact nature of staling is not yet fully understood, it is known that it is not due to dehydration of the crumb but to retrogradation of starch. It is chiefly the linear component of starch, amylose, which retrogrades on ageing, the long fibrous molecules tending to align in parallel with the formation of cross-linkages between them, thus rendering the amylose insoluble and resistant to enzymic attack. Starches of different botanical origin have varying tendencies to retrograde, and it was at first believed that the non-carbohydrate content of starch (protein or phosphate) was responsible for this phenomenon. Amyloses were later shown to be slightly branched themselves, thus tending to show some of the properties of the highly ramified amylopectins. Schoch[8] devised a technique for the sub-fractionation of amyloses and found a relation between retrogradation tendency and chain-length. It now appears that the ease of retrogradation of an amylose is inversely related to its chain-length and that the linear sub-fractions of equal intrinsic viscosity have the same retrogradation tendency, irrespective of their botanical source. The chain-lengths of some important amyloses were determined by Potter and Hassid, using the technique of periodate oxidation,[9] and some values found by them are given below:

	No. of glucose units / molecule
Tapioca	980
Potato	980
Wheat	540
Corn	490
Sago	420

The well-known tendency of tuber starches to retrograde much less readily than wheat and corn starches is shown by the length of the molecular chain of their amyloses in the table above. The inference is that tapioca amylose does not retrograde easily because the molecule is too long to permit ready orientation to an aggregated state.

A large number of processes has been devised for retarding bread staling, most of which involve the addition of chemicals to the dough, which inhibit the formation of cross-linkages between amylose chains. A recent method, patented by Wallenstein Inc., suggests the use of certain enzymes obtained from *Bacillus mesenteri-*

cus and *B. subtilis*, which are added in small amounts to the dough and which become active when the temperature causes gelatinisation of the starch. The enzymes cause limited liquefaction and dextrinisation, thus retarding and sometimes even stopping the retrogradation of starch.

Texture of blancmanges

The consistency of desserts such as blancmanges or the Danish dessert, rödgröd, can be adjusted by the choice of starch used for thickening. To obtain a stiff gel which can be cast into a rigid form in moulds, only maize starch is used. By blending some tuber starches into the corn, a softer, less coherent custard-like texture is obtained. Finally, when only potato or tapioca starch is used, a stringy consistency having some mobility is obtained. These latter gels show some thixotropy, so that the mobility of the blancmange increases on prolonged mechanical agitation.

These phenomena can be explained scientifically on the basis of recent knowledge concerning the formation of hydrogen bonds on starch. It will be noticed that those starches showing the greatest tendency to retrograde produce the firmest blancmanges. Tuber starches, which contain amyloses of the greatest chain-length and which do not retrograde readily, give gels from which strings can be pulled and which have some flow. Corn and wheat starches give rise to considerable hydrogen bonding between neighbouring molecules, thus giving firmness to the mix and also making the products opaque. Tuber starches produce hydrogen bonds much less readily, so that mixes made with potato starch are somewhat mobile and remain translucent for some time. By mild hydrolytic treatment potato starch can be modified to form corn starch type puddings.

The thixotropic behaviour of tuber starches is explained by the rupture of hydrogen bonds under mechanical stress, thus progressively removing any internal stability which the system has been building up by cross-linking between starch molecules. As expected, corn and wheat starches show only a limited degree of thixotropy, since in their cases hydrogen bonds are much more numerous and more firmly established.

Cold water-soluble pudding powders

A new type of dessert has recently appeared on the Continent. It is sold as a dry powder and requires mixing with cold water or sweetened milk only, creating a pudding of the blancmange or custard type. The original patent, dating from 1936, describes the drum-drying of oxidised potato starch. It was recently shown that starch is essentially soluble in cold water. Only in the peculiar form in which it occurs in nature, *i.e.* imprisoned in its own granule, does it require heating to the gelatinisation temperature in order to solubilise. Once having been freed, the starch may be dried and gives a powder soluble in cold water. It was shown that it is not essential for any molecular degradation to occur during drying to produce the cold water-soluble powder, although some breakdown accompanies such methods as drum-drying.[10]

The dehydration of starch has lately been further investigated, and a process suitable for the food industry is described in B.P. 706,622. According to this patent, potato or maize starch is gelatinised in such fluids as water, milk, fruit juice, etc., and subsequently dried on a drum-drier to give a cold water-soluble powder. For household use, 70 g. of the mixture are added to 500 c.c. of sweetened cold milk, affording a lump-free mass which soon turns into a true pudding. Recent experience on the Continent has shown that by using wheat starch a greatly improved product is obtained. It is this mix which has found a considerable market. Once again the choice of starch dictates the properties of the ready-for-use pudding, and by using wheat flour a firm, custard-like product is obtained. The yield of the mix can be increased by substituting spray- or vacuum-drying for drum-drying, since in the former no appreciable degradation of the starch is obtained. The advantage of drum-drying is that the dry powder is produced in the form of fine flakes, which dissolve easily in cold water without the formation of lumps. Another way of overcoming the problem of lumping is to use a powder of very low specific volume (about 200 g. powder per dry litre). This is usually obtained by using spray-driers or by grinding coarser particles obtained by other methods.

I acknowledge the help given to me by the Permutit Co., London.

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English apples have to compete with the finest foreign fruit, well packed and attractively presented to the market. The Ministry of Agriculture's new Bulletin No. 84, *Apple Grading and Packing*, is a useful handbook for all concerned in this exceptionally competitive market. Well illustrated with line drawings and 16 pages of photographs, the bulletin describes modern packaging practice and the proper methods of wrapping fruit for market. In addition, the grading of apples is discussed in detail and much useful information is given about buildings, equipment, organisation and marketing methods. It is available from H.M.S.O. at 4s. 6d. net.

"Some facts about diphenyl wrappers" is the title of a new booklet produced by Monsanto Chemicals Ltd., for citrus fruit packers. The booklet explains that diphenyl wrappers are produced by impregnating ordinary fruit wrapping tissue with diphenyl and discusses their application as preservatives for fruit. Information is given on the printing and storage of the wrappers.

This aerial photograph shows the extent of the fruit pulping and vegetable brining factory described in the article. The vats for fermenting the vegetables can be seen in the centre, just by the left bank of the canal.

The Touch of the Dutch

A BRITISH FOOD TECHNOLOGIST IN THE NETHERLANDS

By James D. Devey, B.Sc.

Last summer Mr. Devey visited a number of food factories in the Netherlands and discussed technical developments with the various managements. Here he gives his impressions of current Dutch practice in the manufacture of rusks, jam, fruit wine, sauces, and flavours, and in fruit canning and vegetable preservation. He also describes the Dutch system of fruit auctioning and distribution and concludes with a few notes on Dutch food habits.

AT THE large factory of the Nederlandse Verbruikscoöperaties (Dutch Co-operative) in Utrecht, besides such non-edible items as soap, detergents and household wax products, a variety of foodstuffs is produced. These include jams, canned fruits, cordials, tomato purée, fruit wines, fruit pulp, confectionery and cocoa products, biscuits, macaroni products and pudding powders.

Automatic rusk making

Perhaps the most interesting feature of the factory is the new plant for the manufacture of Dutch rusks. Completely automatic, it has an output of more than 30,000 rusks per hr. and is the largest in the Netherlands. The Dutch type of rusk, which is peculiar to the Continent, consists of a circular disc of light texture which has been baked, split open and then toasted on the inner surfaces.

In the plant, which is manufactured by Briem-Hengler and Cronemeijer, K.G. (Krefeld, Germany), the pre-mixed dough is divided into dough-balls of about 1 oz. each which are then automatically placed on an endless conveyor belt in four rows of seven balls each. The dough is subjected to a preliminary rising of 10 min. and is then placed in circular metal dishes or trays for a second rising of 40 min. The rusk is then baked for 7-8 min. in the machine, the metal dishes then being automatically removed by magnetic means. The rusks are then automatically sliced longitudinally and the exposed surfaces placed upwards and toasted in a special oven.

The rusk machine is about 80 yards long and, as can be seen in the photograph, doubles back in its own length. It is housed in a building, specially erected for the purpose, which is additionally equipped with all modern con-

veniences for the operators, including showers and lockers. The surfaces of all walls have been fitted with tiles which combine with the large windows to give a pleasant functional appearance.

In the production of jam a vacuum cooling plant is used which enables the solids of the jam to be increased by boiling off excess water at reduced pressure. In place of the usual British method for determining the insoluble solids of preserves, an 8-hr. extraction in a thimble over boiling water is used with success. The thimble, with insoluble matter, is dried after extraction and from this an estimate can be made of the fruit content of the preserve.

An interesting sales "gimmick" for jam is a plastic jar cover with hinged lid and fitted with a plastic spoon which can be suspended from the lid when not in use. These gadgets are made by Ideal Plastics of Brussels and cost the equivalent of sixpence each. They are available in a variety of colours to contrast with or match the colour of the product.

It was noted that Dutch preserve factories pack their products into jars having a smaller neck diameter than the British pattern and that they fill to a stated net weight of 450 grams, *i.e.*, just under 1 lb. Metal caps are quite standard.

The construction of the fruit wine storage tanks was noted with interest, as they are of steel with two lined with *Gashell* (a Swiss bitumen product), two lined with plastic and four with glass. The tanks are made by S.A. La Brauthite of Paris and their capacity is about 1,100 gal. each. The fruit wine contains 12-15% alcohol and is very popular in Holland.

Another Dutch fruit product is lemonade syrup, a clear, flavoured sugar syrup which requires dilution with water before consumption. Although the English translation of the name is "lemonade," in fact a large variety of flavours is produced.

Flavours

About ten miles south from the Yssel Lake (formerly the Zuiderzee) lies the old town of Amersfoort, the location of Polak's Frutal Works, N.V. The factory is particularly well sited as, apart from the good connections for the ports of Amsterdam, Rotterdam and Antwerp, it is close to Holland's principal orchards.

The firm was founded over 50 years ago by Mr. Jacob Polak and his late brother, since when associated factories have been established in New York, Paris and London. During the last war great damage was done to buildings and plant, but since 1945 all has been rebuilt and repaired. As Holland was cut off from overseas markets by the German occupation, Polak's Frutal Works, Inc. (New York) and Soflor Ltd. (Greenford, Middlesex) manufactured materials normally supplied by the Dutch factory and have since continued to do so.

The Dutch factory manufactures concentrated fruit juices and extracts, concentrated and terpeneless oils, oleoresins, and many other materials, the synthetics alone numbering hundreds of compounds. The research, development and compounding laboratories are most impressively designed and equipped. Among their achievements has been the identification and synthesis of the naturally occurring flavouring constituents of strawberries and raspberries. Great attention is also paid to a customer research service whereby finished products containing flavouring materials are produced and evaluated.

With increased production of items like cake and soup mixes, instant puddings, etc., there is an ever-growing demand for new applications of flavours and, more important, the newer types of consumer products require flavours to be "tailor-made" to suit the special requirements of packaging and storage conditions. For these and similar purposes Polak's Frutal Works and associated companies have developed a special line of dry stable powdered flavours made in all stainless steel plant. They are particularly useful for baked goods as they have good "carry-through" properties.

The psychology of flavours and aromas is studied thoroughly at Amersfoort. One interesting application of applied "flavour psychology" was the introduction of a coffee aroma into the atmosphere of a large supermarket to stimulate the impulse buying of coffee and coffee products.

Perfumery raw materials and compounds are also made at Amersfoort.

Fruit processing

The main factory of one of the leading food manufacturers of Holland, Koninklijke Mij. "De

Battery of steel fruit wine storage tanks, two of which are lined with a bitumen product, two with plastic, and four with glass. They are of French manufacture and each has a capacity of about 1,100 gal.

The new automatic rusk making plant at the Dutch Co-operative factory, Utrecht. The plant is 80 yards long and doubles back on itself. Capacity is 30,000 rusks per hour.

Betuwe," N.V., is situated at Tiel. Fruit stations are also maintained at Oudenbosch, Breda, Barendrecht, Ochten and Hoogstraten (Belgium). The list of products made by this company is very large and includes jams, canned and bottled fruits, fruit sauces and cordials, tomato juice and purée, fruit juices and wines, fruit pulps, pectin, etc. The firm deservedly enjoy the royal appointment to Queen Juliana and they have established for themselves a leading position as manufacturers of high quality foodstuffs.

Although the Tiel factory sustained 125 direct hits during the last war it has now been rebuilt and enlarged.

As the fruit season had commenced during my visit, it is perhaps logical to first describe some of the fruit processing operations. The strawberry crop in Holland amounted to some 21,000 tons and a large proportion of this was put down in preservative for export. Although the Climax variety has declined in the U.K., in Holland it exceeded even the popular Jucunda variety in tonnage as it does not seem to have been affected by virus diseases to any significant extent. A great deal of the Climax variety was prepared for pulp for export and a substantial tonnage was canned.

A mixture of sulphurous acid and bisulphite of lime is commonly used for exported casked strawberries for Britain, and the prepared fruit is normally held for a few weeks at the Tiel factory before shipment in order that the berries may be sufficiently firm in texture to withstand the rigours of shipment across the North Sea.

Preserves

A great deal of research is carried out by De Betuwe at Tiel on the preservation of fruits for preserve manufacture. The Dutch Government and the universities play a leading part in providing data for the accurate determination and control of the fruit content of preserves and fruit pulps. All exported fruit pulp must conform to the standards of the Netherlands Fruit Pulp Manufacturers' Association and these standards agree with those set by the Food Manufacturers' Federation in this country.

Dutch Government regulations provide for two standards of jams. A first class jam contains a maximum of 61% sugar, 35% water, 0·7% pectin and 50 p.p.m. SO_2. Artificial colouring is not allowed, except in the case of strawberry jam. Citric and lactic acids are permitted additions. The required fruit contents are: 50% for strawberry, redcurrant and cherry jams (not more than 20% sieved fruit included), 35% for plum jam, 42% for citrus products and 45% for other varieties. These standards compare with 38%, 35%, 40%, 20% and 40% for the same products respectively in the U.K. The British standard is 100 p.p.m. of SO_2.

Mixed fruit jams require 50% total fruit content with at least 17% of the second fruit.

The second quality jams (household grade) contain a minimum of 30% sugar, a maximum of 62% of sugar-plus-glucose and preservative maxima of 75 p.p.m. of SO_2 and 250 p.p.m. of benzoic acid. Artificial colouring is permitted for all varieties of fruit jams in this class.

The minimum fruit content for strawberry, raspberry and cherry jams is 18%, with 14% for most other varieties.

Cherry, strawberry and raspberry jams appear to be the most popular varieties in Holland, with blackcurrant jam at the other end of the scale.

During the visit to the factory large quantities of cherries were being prepared for jam manufacture and for pulping. The fruit was de-stalked on Herbort striggers and then pitted at the rate of about 1½ tons per hr., using Ferrum, A.G. (Rupperswill, Switzerland) machines.

Strawberries were sorted, plugged, washed and inspected over picking belts before being processed, and although it is essential to wash strawberries in Holland where straw is not used around the plants, it was evident that a very clean product was obtained by the use of the water sprays and tanks.

Blackcurrants were strigged on Brierley, Collier and Hartley machines, as the Dutch have not found Herbort striggers to be entirely suitable for this fruit, contrary to the British experience.

Fruit canning

The fruit canning lines are equipped with filling machines and exhausters by International Machinery Corporation, but much British machinery was in evidence. Water flumes are commonly used for fruit washing and

"Novissima" bottle washer at the Dutch Co-operative factory, Utrecht. It has a throughput of 4,000-5,000 bottles or jars per hour.

conveying during canning operations. All canned fruit is stored for at least one month to ensure that defective cans are eliminated before dispatch from the factory.

A De Betuwe speciality product is apple juice or "appelsap," a pure non-alcoholic apple product packed in distinctive bottles. A new Bucher Guyer (Switzerland) apple press of novel design is installed. It operates by rotating a three-head press operating at different controlled pressures so that the apples are gradually subjected to increasing pressings by stages. The apple juice is then stored overnight in stainless steel or glass-lined tanks with de-pectinising enzymes added. These enzymes, which are prepared from moulds in the factory laboratories, are efficient juice clarifying agents. The clarified juice is then filtered through kieselgühr and asbestos filters in order to remove bacteria, and it is then bottled, capped and sterilised.

A noticeable feature of the care bestowed by the Dutch on the storage of fruit pulp casks is their use of straw matting for covering casks stored in the open and the use of revolving water sprays in hot weather. Even the coopers seem to handle casks with particular care, and each cask head is carefully brushed before the cask is opened, the cooper carrying his special tools in a leather shoulder bag.

Jam manufacture

Jam is made at Tiel by a novel process employing continuous conveyor raw material loading and other semi-automatic aids designed to produce large quantities of preserves of standard quality. Although vacuum processing of preserves is not employed, most other processes are of the continuous type, with the exception of jam boiling. Novel automatic cooling and stirring devices are used and palletisation is much in evidence. The jam is filled at a temperature of 80°C., metal-capped and sterilised. Invert sugar is not made and added to jams, the Dutch idea being that the invert sugar should be formed in the boiling process. However, glucose is used for jam manufacture and is obtained as an 80% syrup which is heated by hot water-filled hollow-bladed stirrers to a temperature of not more than 60°C. before adding to the jam boil. Glucose is not a permitted additive for top-quality jams, however, but is used for the second-quality types. Rapid-set pectin is commonly used.

All glass packages are sold on a deposit basis, which appears to be customary in Holland. Apparently transport and collection are not the difficult problems they are in Great Britain. Bottled fruit is more popular than canned fruit in the Netherlands, apparently because the customer can thereby see exactly what he or she is buying!

A familiar Dutch product and one that is manufactured extensively is "puddingsaus" or fruit sauce. As the name implies it is used hot or cold for pouring over the sweet. The sauce is a semi-viscous liquid made from fruit juice and/or fruit and glucose, to which citric or lactic acids are added. 0·2% of thickener is permitted and this is often carboxymethylcellulose. The standards laid down define a maximum water content of 45%, a minimum sugar content of 45% and a minimum figure of 30% for fruit juice or fruit purée.

Dessert sauce is a similar product to which it is permitted to add essences instead of fruit juice. A minimum of 35% sugar is a standard for this product. These sauces are manufactured in a large variety of flavours and are filled into bottles which are crown cap closed before sterilising.

Fruit pulping and vegetable brining

The final factory visited was that of a large organisation which does a very big trade in fruit pulps and brined vegetables. The firm wishes to remain anonymous.

All fruit in Holland is sold at auctions and each village and district has its own co-operatively owned auctions. Auctioneering is controlled by a central body and all auctioneers follow the quality standards for fruits and vegetables laid down by the Government. The Dutch food manufacturers discuss fruit quality descriptions with the auction organisers, and the standards arrived at are submitted for Government approval, the Government having the power to fix and publish these standards. If a parcel of fruit or vegetables is below standard and has been turned down by manufacturers there is an agreement that their colleagues will also refuse to purchase.

One disadvantage of the auction system is that in a short crop season prices are probably sent up more quickly than would otherwise obtain, but in a plentiful

supply market buyers can get their raw materials at reasonable prices and the market average for good quality fruit and vegetables tends to sag easily.

With the Dutch system the total figures for the different fruits, etc., are known with certainty daily as all auctions are public.

Strawberries are sold at auction plugged in chips each containing about 5½ lb., and they arrive at the factory between midday and midnight. In fact it is quite common for fruit processing to be carried on during each night of the season. The incoming fruit is carried over endless belts and washed and sprayed on entry to the factory. These belts serve also as sorting points where all foreign matter can be removed. From the belts the fruit is tipped into barrels (usually oak whisky casks) ready for the addition of preservative solution and heading up of the casks.

Raspberries arrive at auction in wooden tubs, each containing 22 lb. The Dutch crop was low last year at 3,000 tons compared with 5,000 tons for 1954.

Blackcurrants are sold in half sieves of 22 lb. each. They are grown throughout most of Holland. In 1952 in Holland more than 2,000 tons of blackcurrants could not find buyers at the minimum price of £55 per ton and so many growers switched to other fruits. As a consequence of this and the fact that in Western Germany this fruit is now being processed in large quantities for use in drinks, it is easy to understand how the price last year reached the phenomenal figure of £250 per ton. The crop was about 3,600 tons, but it was obviously well below demand.

Up to about 1950 or so large quantities of gooseberries were exported to Great Britain, but the effect of high duties has been to reduce the crop to only one-third of the pre-war level.

For fruit remaining unsold at auctions the growers have fixed minimum prices which are usually low. If the fruit still has no buyers it is pulped and sold as such on a centralised basis.

Vacuum cooling plant for jam manufacture which enables the solids content of the jam to be increased by boiling off water at reduced pressure.

The main vegetables prepared in brine are silverskin onions, gherkins and cauliflower. Silverskin onions are grown exclusively by the preserving industry and do not pass through auctions. The organisation visited grows all its own onions for this purpose and preserves about 3,500 tons in a season. The firm experiments extensively with seed varieties and manuring systems, etc. The onions are first peeled by hand and then brined. They are then fermented in very large storage vats before being re-sorted and packed either in glass jars or casks for export.

Gherkins are passed through the auction system in exactly the same manner as fruit. About 20,000 tons were handled last year. The factory packs about 3,500 tons of gherkins in each season and a large amount is pasteurised in bottles, jars and cans in a fresh condition, thus reflecting the continental taste. The graded gherkins are also sliced in many different ways and exported in casks after fermenting and brining. These find a use in products such as mixed pickles and chutneys.

Cauliflowers are handled by the auction system and are a large export item.

Dutch food habits

It is most noticeable that the standard of food preparation and serving is superior to that in Great Britain. Service in all food establishments is excellent, and the average Dutchman will readily refuse food or service that is not of the highest quality. Hence, dissatisfaction with prepared food is a rarity in the Netherlands. Food hygiene too is of top standard, and a popular feature is the dispensing of sugar in 1-cup packets with hot beverages.

The Dutch appear to have a decided liking for seafood of all types, and products such as smoked eels are very popular. Another popular food is the fresh raw herring. This is common at the start of the herring season and the first of the "green" herrings are greatly esteemed by the discerning. Great honour is attached to the first supplier of herrings in season to Queen Juliana.

Raw herring is served with toast or rusk and sometimes with raw onions. It is common to see people eating herrings, held tail uppermost, at the fish stalls! I can vouch for the delicate flavour of the raw fish.

Breakfast and luncheon are for the Dutch people relatively modest meals, with a variety of cheeses and breads usually served. Dinner is the big meal of the day and the food appears rather rich to the British palate. Sauces and pickles as we know them are infrequently

(*Turn to page 25*)

THE VACUUM CONTACT PLATE METHOD OF FRUIT DEHYDRATION—1

By Alan E. Joyce

(*Ministry of Agriculture, Fisheries and Food Research Establishment, Aberdeen*)

This is the fourth article in the series on dehydration to appear in "Food Manufacture" since March. While, as described in the three previous articles,[1, 2, 3] dehydrated potatoes, cabbage and carrot are now being produced in this country, fruit is not commercially dried because of our unreliable climate. Hot air drying of certain fruits can produce a satisfactory product,[4] but the technique is limited, both with regard to the fruit that can be handled and the moisture content attainable, with the implications of the latter for storage life in hot climates. The vacuum contact plate method, which is being studied at Aberdeen, has, however, given promising results, and has shown that the principle of dehydration in vacuo between movable pairs of heated plates is readily applicable to fruit, although the equipment used (which was designed for fish dehydration) is not in every way suitable for handling fruit.

Dehydration as a means of fruit preservation

THE desirability of preserving seasonal commodities has been recognised from earliest times. Sun drying of fruit is the oldest method of food preservation; canning, bottling and quick freezing are relatively recent advances, but dehydration is drying in modern guise with proper scientific control. Dehydration has certain special advantages; in particular it leads to a great reduction in the bulk and weight of the product, with consequent lowering of packaging, storage and transport costs. It may also provide the basis for new foods. Among the disadvantages of dehydration, however, are the facts that the product is not ready for immediate use but requires reconstitution and the use of a little skill on the part of the consumer; it may be more costly than other methods of preservation, though, under certain circumstances, the reduction in transport costs of the final material may largely offset this. If the dehydrated material is made up into a new type of food then the market acceptability may well counterbalance the relatively high price. The process involves certain technical difficulties, but these will be outlined in succeeding paragraphs.

Principles of fruit preservation

It is when fruit is ripe that man prefers to eat it and generally derives most nourishment from it and, ideally, it is then that it should be removed from tree or bush and an attempt made to preserve it in some form as nearly as possible resembling the fresh, or perhaps to convert it to a pleasant food not at all like the fresh, *e.g.* prune. Once the fruit is fully ripe, however, autolysis begins to replace organised respiration and maturation. The plant cells are no longer masters of the chemical compounds whose distribution and reactivity they have hitherto controlled for the maintenance of the characteristics of the tissue: it is said that the organised resistance of the cells is destroyed. Chemical compounds previously kept separate now come into contact and react, with the help of catalysts, *e.g.* enzymes and trace metal ions, to produce colours and flavours foreign both to the tissue and the palate. This process results also in the break-down of cell walls, the outer waxy cuticle no longer functions as a microbiological barrier, organisms invade the tissue and bacterial decomposition joins with autolysis to complete the destruction of the tissue.

Autolysis commences within a few hours of picking and will increase in intensity unless preservation is carried out. In the case of dehydration, the usual process of blowing hot air over the living tissue actually stimulates autolysis owing to the increase in temperature of the tissue. Thus a race starts between the processes of decomposition and the removal of water to a state when there is insufficient water present for the reactions to take place. The intervening stages of increasing concentration of reactants can be particularly disastrous. The characteristics of the fresh material may be lost and one may be confronted with an unrecognisable object with both unpleasant flavour and rubbery texture. It is the prevention of autolysis and the resulting unpleasant flavours and colours that constitutes the first major problem in fruit dehydration. The second objective is to remove the water at as low a temperature as possible to prevent the thermal stimulation of undesirable chemical reactions and also to lessen the loss of volatile constituents.

Principles of enzyme inactivation in fruit

The imported sugar-rich fruits, *e.g.* sultanas, raisins, dried apricots, and figs, are slowly sun dried with some autolysis. On reconstitution they differ in colour, flavour and texture from the fresh fruits, but are nevertheless acceptable products. The acid nature of British fruits does not enable them to be dried slowly with gradual autolysis to give fruits like sultanas, raisins or dried apricots.

To prevent autolysis, the drying process must be preceded by some means of enzyme inactivation. This inactivation may be based either on the use of an enzyme inhibitor which combines with the enzyme itself or with its substrate, or on thermal degradation of whole or part of the enzyme.

The former method has limitations in that it involves the addition of chemical compounds to the food and the toxic properties of these may be difficult to assess. It was used successfully by West *et al.*,[4] who employed sulphiting for enzyme inactivation with apple and pear and found that subjecting the fruit to an atmosphere of SO_2 at a concentration of about 5% produced the best results. The impregnation of large pieces of fruit or whole fruits with SO_2 presented difficulties. Plums were lye dipped for 10-15 sec. to produce epidermal rupture, *i.e.* to "check" the skin, and then sulphited.

The thermal method (*i.e.* scalding) is based on applying to a protein molecule sufficient heat (*a*) to denature it, so destroying the state of orientation of amino acid chains, (*b*) to detach its prosthetic group, or (*c*) to destroy the prosthetic group. The scalding times and temperatures required for the inactivation of different enzymes vary, and in some instances the temperatures required may be quite high.[5, 6] Under certain conditions enzymes may regain their activity by reorientation of the amino acid chains or by reunion with the prosthetic group.[7] A detached prosthetic group, if unaltered, may exhibit catalytic power, but of much less intensity than when attached to the protein.

Table I—Effects of Scalding

Fruit	*Max. Temp. °F. to which fruit is heated*	*Time at the maximum (secs.)*	*Appearance*
Blackcurrants	160	5	Skin just broken
	180	5	Skin badly broken
Gooseberries	160	5	Skin just broken
	180	5	Tissue pulped
Raspberries	160	5	Just dripping
	180	5	Dripping badly
Apples:			
Ellison's Orange	160	5	No browning; still firm
Peasgood Nonsuch ...	160	5	Browning in centre on standing in air for 2 min.
Peasgood Nonsuch ...	200	5	Tissue pulped badly
Joy Belles	200	5	No browning; no pulping
Bailey Nelson	200	5	No browning; tissue pulped
Allington Pippin	200	5	No browning; no pulping
Bramley	185	5	No browning; no pulping
Bramley	200	5	Pulped badly

Scalding

When experiments on fruit dehydration were started at the Aberdeen Experimental Factory it seemed likely that some form of pretreatment would be necessary. Scalding in steam was the most easily effected and was used throughout. Where large quantities of fruit were being scalded by the batch process it became necessary to stop the enzymic browning of cut surfaces, *e.g.* of apples, pears, plums and peaches. Spraying with a 0·1% solution of sodium bisulphite or ascorbic acid[8] inhibited this browning, but the effect of the sulphite was much more lasting than that of the ascorbic acid, which was effective while the tissue was immersed in the solution, but, after removal, 15 min. appeared to be the maximum time for which it could be exposed to the atmosphere before scalding, unless the concentration of ascorbic acid was increased.

In addition to the effect on the stability of enzymes, scalding increases the permeability of the protoplasm to vacuolar contents and impairs the structural rigidity of the cell walls, both effects being considerable. The vacuolar contents of fruit are of great importance for flavour, colour and nutrients, and severe scalding conditions result in much juice loss on account of drip. This loss of juice is probably the most serious aspect of scalding fruit. It may be partly overcome by both careful handling and scalding. Cell wall breakdown may be accompanied by the disruption of cohesion between the cells themselves, due to the destruction of the middle lamella, making the fruits extremely difficult to handle. The very acid nature of some fruit is believed to be a factor in destroying the middle lamella.

Steam scalding, however, tends to assist the removal of water and shortens the drying time in vacuum dehydration, and has also been found to improve the texture of dehydrated apple. It has no effect on the texture of dehydrated raspberry and very little on blackcurrant. The improvement with apples may seem contrary to the findings of West *et al.*,[4] but may be explained by the fact that in their experiments water scalding was used.

Steam scalding may alter the flavour of fruits by distilling off volatile components, or it may lead to the development of a cooked flavour. This is particularly true of blackcurrants. Vacuum dried, raw blackcurrants possess a delicate, earthy tang which is absent in vacuum-dried steam scalded fruit, and much less intense, though not absent, in fresh, cooked blackcurrants. Gooseberries show a similar effect, where steam scalding tends to intensify the cooked flavour of the subsequently reconstituted stewed product. Bananas also tend to acquire a cooked flavour with scalding, and the intensity may be varied by the scalding time. It must be pointed out, however, that heat does not always seem to be essential for a "cooked" flavour to form, it may occur in some low temperature concentrated fruit juices.

Where there is a considerable thickness of tissue to be scalded, care must be taken to ensure that it is scalded throughout, otherwise adverse chemical reactions can take place immediately it is

withdrawn from the scalder. With apples and pears this is shown by the formation of a brown interzone between the adequately and inadequately scalded regions, or throughout the latter region entirely. This effect has been noted in bananas also and may be attributed to the breaking up of the organisation resistance without the inactivation of the enzymes by thermal denaturisation of the protein, thus destroying the separation of mutually reactive organic substrates without destroying all the catalysts.

The adequacy of enzyme inactivation by scalding is often difficult to determine, since, with intensely coloured fruits, the conventional hydrogen peroxide-guaiacol peroxidase test is possible only by lengthy spectrophotometry. (The tetra-pyrolic group detached from enzyme protein can also give a positive result.) It has been necessary to resort to the rather arbitrary method of finding the highest scalding temperature attainable without severe tissue breakdown (Table I). This method of scalding has proved successful with blackcurrants, gooseberries, strawberries and raspberries. The peroxidase test can be used with plums. Apples and pears are self-indicating, incomplete inactivation of the catalysed reactions being shown by the formation of the brown zone between the scalded and unscalded region. The extremely acid nature of many of the fruits makes scalding of them without cell wall breakdown very difficult, especially with certain varieties of apple, *e.g.* Bramley (see Table I), blackcurrant, gooseberry, strawberry and tomato; in the last of these raw-drying (*i.e.* dehydration without prior scalding) is still the only method which has met with success. In the scalding of fruits, therefore, a balance has to be maintained between enzyme protein denaturisation, destruction of protoplasmic impermeability, and middle lamella breakdown.

For soft fruits in particular, it may be possible to find other pretreatments involving less juice loss and flavour change. In certain cases it may be possible to dispense with pretreatment if the undesirable enzyme reactions of autolysis can be inhibited by modifications in the drying technique. It may be possible to freeze the fresh material and then thaw simultaneously with drying.

The suitability of any of these methods can only be decided after a detailed study of their influence on nutritive value and culinary quality both during drying and storage.

(*To be concluded*)

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Horizons in Microbiology

ON June 7, 1954, a new Institute of Microbiology was opened at Rutgers University, under the directorship of Dr. S. A. Waksman.

To many British microbiologists the name of Waksman was first familiar through the publication in 1931 of his fascinating compendium "Principles of Soil Microbiology." Both before and after this date Waksman devoted much attention to the filamentous bacteria known as *Actinomycetes*; he and his collaborators were therefore in a strong position when the great gold rush for antibiotics showed this rather neglected group of organisms to offer the richest lodes. These have been actively and brilliantly developed by Dr. Waksman and his colleagues.

The present symposium* contains 13 contributions by eminent microbiologists, and an appendix recording certain speeches delivered at the opening ceremony. It is a well-produced and attractive volume, though in places far from easy reading.

The first four papers deal with the microbe as a living system. Van Niel gives timely emphasis to the need for a biological as well as a biochemical approach to microbiological problems. Other sections deal with microbial genetics, and with certain enzymatic studies on mutants. Lwoff's discussion on "metapoietic integrations" is comprehensible only to phage experts.

Next follow five papers on the metabolism of micro-organisms. Investigational methods that have proved useful are reviewed—balance sheets, radioactive tracers, enzyme extracts, chromatography, etc. Other subjects considered include mould metabolism, nitrogen fixation and "metabolic pathways." An interesting paper describes the work of the Upjohn Co. on steroid transformations, one result of which was a simplification of cortisone synthesis by the use of certain mould fungi.

The final group of papers considers micro-organisms in relation to higher forms of life. Unsolved problems of immunisation, viruses and antibiotics are discussed, and also the relationship of soil micro-organisms to crop plants.

It is clear that much work awaits the new Institute. As Prof. A. J. Kluyver aptly remarked in his address at the opening ceremony: "The Institute has been born of microbial antagonism. May it forever be a symbol of human symbiosis."

L. D. GALLOWAY.

* *Perspectives and Horizons in Microbiology*. Ed. by S. A. Waksman. Rutgers University Press, New Jersey, 1955. Pp. 220.

200 Tons of Biscuits a Week

Huntley and Palmers' new factory at Liverpool

THE PROSPERITY of the biscuit industry—the present demand is breaking all records—is reflected in the opening last month of Huntley and Palmers' new factory at Huyton, Liverpool. At present the factory employs 750 people, of whom three-quarters are women and girls. It covers an area of 171,550 sq. ft., and it is planned to eventually cover 294,000 sq. ft. and have a staff of 1,500.

The shortage of labour available for their Reading factory and the increasing market for their biscuits led Huntley and Palmers to examine the possibilities of a new factory several years ago. No less than 26 separate sites were examined before this one was selected. The factory stands on a 4-acre site with an adjacent 5 acres which it is expected will be developed before long. It is situated on a large industrial estate adjacent to four other factories, with a large housing estate within easy distance. The majority of the labour force has in fact been obtained from this estate. The factory is not rail connected, but this does not present a major problem as the tins of finished biscuits are loaded into containers and conveyed to the railway by articulated lorries.

The factory is equipped with convection-type ovens, four of which are already working day and night shifts, with a weekly output of approximately 200 tons. The whole factory has been designed so that the ingredients, as far as possible, should be taken to the top floor by elevators and other means so that they can fall by gravity to the weighing and mixing drums and from there to the rollers and ovens. For the time being flour will arrive in and be stored in sacks, but eventually it is intended to build silos into which the flour will be pumped direct from the lorries. Fat will arrive at the factory in liquid form and will be stored in tanks on the top floor. Sugar will be stored in 40-ton silos and conveyed from there by a worm conveyor, which will feed it into a bucket elevator, taking it to the top of the building, where it will be automatically fed into the grinding mills. There are to be three cold stores with temperatures varying from 15° to 35°F.

Biscuits emerging from the automatic ovens.

All running repairs will be carried out in a separate maintenance department. Instead of the usual high-pressure steam pipes running throughout the factory, hot water at high pressure is being used. This is heated by two boilers using solid fuel.

Baking is done by gas, and each oven uses approximately 80 cu. ft. of gas per min. As they are electrically ignited, lighting takes only a few seconds. The whole process, from the raw materials to the finished product, is fully automatic and carried out under the most hygienic conditions, indeed the company claim that their biscuits are practically untouched by hand. Apart from the actual baking, allowance has been made for various creaming and chocolate enrobing processes, so that a great variety of biscuits can be made, especially those which are popular in the North.

Particular attention has been paid to welfare and the factory has a well-equipped health centre, supervised by a permanent Sister.

The new factory at Huyton, Liverpool.

Last Volume of "The Vitamins"

This, the third and last volume* in the series, includes accounts of three of the most important vitamins used therapeutically: pteroylglutamic acid, riboflavin and thiamine, as well as *p*-aminobenzoic acid, pyridoxine and related compounds, vitamin E, and "new and unidentified growth factors." As the book is written by numerous specialists, the treatment accorded to each section tends to vary, and there is a certain amount of duplication, particularly in the chapter on *p*-aminobenzoic acid.

The subject of pteroylglutamic acid has been competently handled by three authors and the section relating to industrial preparation is exceedingly well written. The sections on the conjugates of pteroylglutamic acid, their biological properties and methods of estimation provide a clear and critical account of a very complicated subject. The effects of pteroylglutamic acid on anaemias are discussed. Regarding the occurrence of pteroylglutamic acid a warning is given not to attach too much weight to the older figures recorded for the amounts in different foodstuffs, since most of the assays were done before the citrovorum factor was recognised. From this point of view this section is perhaps the most salutary of any in the three volumes, and all nutrition workers should ask themselves to what extent chemical or microbiological assays give a true indication of the biological value of a foodstuff.

A similar problem is raised in the corresponding section in the vitamin B_6 chapter. Vitamin B_6 is known to exist in three forms, pyridoxine, pyridoxal and pyridoxamine, and the amount of each in different foodstuffs varies considerably, as also do their biological activities. To complicate matters still further, two of them can exist in the form of phosphates. The authors have gone to enormous pains in collecting the values reported in the literature for the vitamin B_6 content of foodstuffs, and they have indicated against each result the method used to obtain it. The complexities of the problem will be appreciated when it is realised that 13 different hydrolytic procedures have been used as well as numerous chemical methods of assay. Small wonder that the values obtained by different workers for the same foodstuffs often vary considerably.

The section in the vitamin B_6 chapter on industrial preparation is much less adequate than the corresponding section in the pteroylglutamic acid chapter, mainly because it is difficult to obtain precise information about the commercial methods used. Similar difficulties have been evident in other chapters, and in the reviewer's opinion it would have been better to have combined the sections on synthesis and industrial preparation giving references to both the scientific literature and the patent literature.

By comparison with the two earlier chapters, that on riboflavin is relatively simple because the vitamin exists in only one form.

In the chapter on thiamine the most interesting section is undoubtedly that on the function of the vitamin, since even now there are still many matters on which further light is needed. It would probably have been more informative to have included in the thiamine chapter the section on lipoic acid which at present appears in the chapter entitled "New and unidentified growth factors" because it is now known that lipoic acid is the co-enzyme responsible for the oxidation phase of pyruvate metabolism, cocarboxylase being responsible for the de-carboxylation phase.

In the chapter on the tocopherols the sections on chemistry, biochemistry and estimation, are perfectly straightforward, but most readers will agree with Dr. H. A. Mattill's statement in the introduction that,

> "So many connections have been established with other biological processes that even a brief survey of them is little short of bewildering."

and will turn to Dr. Karl Mason's section on vitamin deficiency for further enlightenment. This section is a very valuable summary of what is known of the effects of vitamin E deficiency in both animals and man and does much to clarify the very obscure situation. The conclusion reached in this critical review is that in neither habitual abortion nor progressive muscular dystrophy is there conclusive evidence that the vitamin has therapeutic value; on the contrary, as the author says,

> "There has arisen an extensive and decidedly controversial literature regarding the therapeutic efficacy of vitamin E in a variety of clinical disorders which often have little in common with the deficiency syndrome in lower animals and which are not associated with any known inadequacy of vitamin E in the diet or in body tissues."

The final conclusion appears to be that the tocopherols may be of importance as biological antioxidants and any therapeutic value they possess may result from this property.

The three volumes of this series together provide a complete survey of all that is known at the present time about the vitamins and it will long remain a standard work of reference for those who require information of various kinds about them.

F. A. ROBINSON.

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* *The Vitamins: Chemistry, Physiology, Pathology.* Vol. III. Edited by W. H. Sebrell, Jun., and R. S. Harris. Pp. xiv+665. Academic Books, London. 1954. 120s. net.

The special applications to the baking industry of polytetrafluoroethylene (P.T.F.E.) are discussed in a brochure issued by Dunlop. The brochure instances a typical application of P.T.F.E. "as a covering on dough sheeting rollers where its remarkable non-stick properties prevent dough build-up, and thus substantially reduce the frequency of stoppages for cleaning." A further saving in material, it is pointed out, "is also effected because the rollers need no dusting with flour and there is less wastage of raw dough." In the food industry sprayed P.T.F.E. dispersions can be applied as a coating on moulds and formers, ensuring the quick and clean release of products without the need for frequent lubrication.

Radioactivity and Food Processing

"Applications of Radioactivity in the Food and Food Processing Industries" was the title of a symposium held recently in Boston, U.S.A., by Tracerlab Inc. The principal speaker was Dr. Paul B. Pearson, chief of the Biology Branch of the U.S. Atomic Energy Commission, who told how radio-isotopes were helping to discover the secrets of photosynthesis, how they would play an important role in raising the level of the world's food supply by fertiliser uptake studies and the development of new plant strains, etc. Summaries of papers dealing with present applications of radioactivity in food processing appear below.

Cold Sterilisation

Bernard E. Proctor (*Head, Department of Food Technology, Massachusetts Institute of Technology, Cambridge, Mass.*)

Ionising radiation both from radioactive isotopes and mechanical accelerators are able to destroy all types of living organisms likely to be in food, in every known type of food package, providing the package dimensions are within the limits imposed by the type and energy level of radiations which are necessary for cold sterilisation.

These living organisms may be those which cause spoilage, such as bacteria, yeasts and moulds, or insects such as weevils which may make the products inedible, or pathogens such as *Trichinella spiralis* which may cause illness if foods infected with such organisms are ingested by humans.

The difficulties which necessitate further research before cold sterilisation becomes a practical processing method in the food industry were cited and comparisons made with the pharmaceutical industry in which cold sterilisation is now an accepted procedure.

ATOMIC GLOSSARY

W. C. Peacock, the technical director of Tracerlab Inc., gave these definitions of basic terms.

Atomic Mass[A]—The atomic mass of a neutral atom is approximately equal to the number of neutrons plus the number of protons in the nucleus (plus the mass of the orbital electrons).

Curie—Unit of radioactivity equal to 37,000 million ($3{\cdot}7 \times 10^{10}$) disintegrations per sec. and represented by the symbol c.

Fission—The splitting of a heavy nucleus into fragments of more or less equal mass (fission products) plus two or three neutrons. Fission products are usually radioactive and many undergo a series of radioactive transformations until they form a stable nuclide.

Gamma ray (photon)—A penetrating electromagnetic radiation of about 0·1 to 3 mev. emitted by some nuclei in the course of radioactive decay.

Isotope—Atoms of the same element, but differing in atomic mass, are called isotopes of that element. The isotopes of an element are almost identical in chemical properties.

Labelled compound—A compound that has incorporated in it a radioactive isotope.

Million Electron Volts (Energy) MEV.—The energy an electron acquires when it is accelerated through a million volt difference in potential. This energy is approximately $1{\cdot}6 \times 10^{-12}$ ergs.

Neutrons—An elementary particle having zero charge and a weight approximately the same as the hydrogen atom.

Nuclide—The general term that includes the nuclei of each of the isotopes of all of the elements.

Tracer (Radioactive)—Refers to a radioactive isotope or labelled compound used to enable the distribution or location of the material to be determined subsequently.

Radiopasteurisation

Lloyd E. Brownell (*Director, Fission Products Laboratory, University of Michigan*)

The most promising proposed uses of gamma radiation from fission products appear to be various biological applications and the promotion of chemical reactions.

The lowest dose of gamma radiation studied that appears promising is 10,000 rep used for tubers, such as potatoes, and onions to prevent sprouting. Over 2,100 taste tests were made with irradiated potatoes and controls by a panel using the incomplete block ranking procedures. Statistical analysis of the data indicated no preference for control over irradiated potatoes. Three facilities were designed for commercial irradiation of potatoes using cesium-137, mixed fission products, and cooling reactor fuel elements. Estimated costs of irradiation averaged about $4 per ton and were lowest for the facility using cooling reactor fuel elements.

A dose of 25,000 rep was shown to be sufficient to break the cycle of trichinosis caused by human consumption of fresh pork infested with *Trichinella spiralis*. A radiation facility was designed to treat 2,000 hogs per day at an estimated cost of $0·29 per hog, using a 1·5 megacurie cesium-137 source.

A dose of 25,000 rep might also be used to treat grain, flour, cereal products, etc., for control of insect infestation. Bread, all purpose, and cake flours were irradiated and bread, biscuits and cakes were prepared. Taste panel tests indicated that doses under 50,000

rep produced no undesirable change. A facility was designed to irradiate flour in 100 lb. bags, using cooling reactor fuel elements as the radiation source, at an estimated cost of 2 cent per 100 lb. bag.

A radiation dose of about 80,000 rep appears promising as a means of "radiopasteurisation" to increase refrigerator storage life of fresh meat and seafoods. A new method of wholesaling these perishable foods is possible with cutting and prepackaging at the packing house. A radiation facility was designed to "radiopasteurise" about 14 tons per hr. of prepackaged meats using a cesium-137 source. The estimated cost of irradiation is less than 1 cent per lb.

As a possible "new" process, it is proposed that cooked meats and other perishable items in which the enzymes have been inactivated be packaged in heat-sealed polyethylene bags and given a dose of about 1 megarep, followed by storage for several months. It is believed that safe storage for several months will be possible by such a procedure. If the food is acid, the storage temperature probably could be raised to room temperature without danger of food poisoning.

Nutritional Studies

Felix Bronner (*The Hospital of the Rockefeller Institute for Medical Research, New York*)

For the past 20 years, phytates, the salts of inositol hexaphosphoric acid, have been known to interfere with calcium absorption. Animal experiments, followed later by human studies, demonstrated that calcium uptake is reduced when phytates constituted a significant part of the phosphate content of the diet and when the calcium intake was relatively restricted.

The mechanism of action of phytates is not well understood, however, and the full significance of phytates in diets such as those commonly encountered in the United States has not been clearly established. The availability of radiocalcium, Ca^{45}, made it possible to reinvestigate this problem, with the hope of pinpointing the action of phytates more directly.

Radiocalcium was given to boys in institutions under relatively uniform conditions. Two types of breakfasts were used: a low-calcium one, containing approximately 85 mgm. Ca, and one of moderate calcium contents (240 mgm.). Each study employed a phytate-containing cereal (oatmeal), and a phytate-free cereal (farina). In addition, sodium phytate was added to the farina in the low-calcium study.

When the calcium content of the breakfast was only 85 mgm., phytate had a marked and significant effect on calcium uptake. At the higher level of calcium intake, however, no phytate effect was observed.

Tracers for Analysis

Charles Rosenblum (*Merch and Co., Inc., Rahway. N.J.*)

The extreme sensitivity of detection of radioisotopes, combined with the unequivocal distinction between endogenous and added element and/or compounds, enables one to perform difficult analyses on the micro level and to determine the stability of organic and inorganic compounds in complex organic media. Added to these advantages is the facile manner in which certain physical properties can be determined and recovery efficiencies ascertained in analytical investigations.

These aspects can be abundantly illustrated by experiences in the food and pharmaceutical industries. Direct analysis for vitamin B_{12} and streptomycin can be performed radiometrically by isotope dilution. Observations concerning the stability of vitamin B_{12} in multivitamin mixtures has been greatly facilitated by the availability of vitamin B_{12}-Co^{60}. The reverse isotope dilution method has been employed to ascertain the stability of vitamin B_{12} in cereals. The fate of potassium iodate during the baking of bread was elucidated by applying the carrier technique to bread baked with $KI^{131}O_3$. Measurements of solubility, air concentration and extent of utilisation of labelled compounds by animals performed by radiometric procedures are a great simplification over conventional methods of obtaining such information.

Nuclear Automation

S. E. Eaton, and W. V. Keary (*Chemical Engineering Department, Arthur D. Little, Inc., Cambridge, Mass.*)

An opportunity exists for the food industry to employ, for better process and product control, new techniques and apparatus offered in the field of radioactivity. Improved control based on older methods has been slow to find acceptance, but it is hoped several advantages of convenience, reliability and cleanliness will prove sufficiently attractive to arouse enthusiastic adoption. It is believed that those who make use of new control techniques will find many advantages in reduced losses of raw materials or product, lower processing cost, and improved product.

Radiation techniques offer new sensing elements in the form of devices which measure the transmission and scattering of controlled low level radiation. The food material in process affects this radiation so that the level of radiation "seen" by a detecting device is a function of the property being measured. Containers, even metal, are not opaque to such radiation and possible contamination from mechanisms which must contact process materials is avoided. Since the sensing devices can be quite small, they can be located directly at the point where control is needed, thus eliminating process lags. It is important to realise that the methods under discussion add no radioactivity to the material in process and do not affect it in any detectable manner.

There are several properties which have effect on low level radiation and therefore can be monitored. Among these are weight (mass), thickness, density, composition and level. There are already several examples of use of these devices in the food industry.

Research on Low-cost Foods

By W. Williams

The South African Council for Scientific and Industrial Research, in collaboration with other interested parties, is actively sponsoring several important lines of research into improved foods and beverages which are of high nutritional value, yet within the purchasing power of the poorer population.

Bean foods

A LARGE-SCALE investigation into the protein value of beans grown in South Africa is being conducted by the National Nutrition Research Institute with the co-operation of the Pretoria Medical School and General Hospital. Many varieties of beans are grown in the Union, but some types, especially those cultivated by the natives, are little known, and a detailed survey is being carried out to establish the best beans for large-scale cultivation from both the nutrition standpoint and also that of resistance to extremes of climate. Soya beans are still produced in only limited quantities, but in view of their high protein content, they are regarded as a valuable supplement to cereals such as wheat and maize in attaining a balanced diet where insufficient meat, eggs, etc., are eaten because of their high cost.

The Nutrition Institute has laid particular stress on the value of dried beans as a practical food, and is at present formulating a nutritious infant food with beans as the base. Mixtures are rigorously tested chemically and biologically on experimental animals before final clinical tests on both normal and underfed children. Further bean foods, using a precooked bean powder, will be developed for adult consumption, and eventually a recipe book of various bean dishes will be drawn up to popularise beans as a major food item in the battle against malnutrition in South Africa's native population.

Food yeast

South Africa is fortunate in possessing a cheap source of food yeast in the waste molasses derived from the Natal cane sugar industry. The Nutrition Research Institute, partly supported by a grant from the Food Yeast Development Corporation of Natal, is investigating the many possible uses and the nutritional value of the food yeast prepared from molasses residues through the action of the now well-known *Torula utilis* organism.

Experiments are in progress on the enrichment of bread with food yeast, and in particular the effect which the yeast has on the baking qualities of the bread is being studied. As already mentioned, the Institute is developing infant foods with a soya bean base, and here also it is hoped to incorporate the food yeast. The meaty flavour of the local product makes it well suited for human consumption as a cereal supplement and nerve tonic, taken in foods such as porridge, milk and soups. When the best methods of using the food yeast have been worked out more fully, it is hoped to compile various recipes to encourage its use.

Kaffir beer

The C.S.I.R. has been conducting extensive research into the mechanism of the kaffir beer brewing process over the past three years. The brewing of kaffir beer is now a major industry in the Union, production having risen rapidly during the last few years, so that now municipal breweries alone produce more than 20 million gal. of this beer annually for native consumption, valued at over £2 million. The beer is produced from kaffir corn in modern stainless steel plant fabricated on the Rand, which ensures the necessary cleanliness and close control of brewing operations.

The initial research problem was to isolate and identify the lactic acid bacteria and yeasts responsible for the desired fermentation, as well as a study of organisms responsible for spoilage of beer, especially under the old primitive conditions in which brewing was carried on. Emphasis has now been shifted to the malting process, and factors influencing malt quality, such as the times and temperatures of steeping and germination, are being studied. As a result of the work already carried out, malts of very much higher diastatic power than those at present available commercially have been produced in the laboratory. A survey of the commercial malts revealed big variations in diastatic power, so that many breweries now insist on a diastatic specification when ordering supplies of malt for the brewing of kaffir beer.

Research work on kaffir beer is being intensified at the National Chemical Research Laboratories.

Touch of the Dutch

(*From page 17*)

used, as the Dutch prefer to eat their food with all the natural flavours brought out rather than disguised with condiments and vinegar products. The gourmet would be interested in the beefsteaks cooked "rare" and served with the fat in which they are prepared. Rice dishes, originating in the Dutch Indies, are rightly famed. Enormous quantities of garden peas are canned in Holland, and such is the abundance of and preference for good quality vegetables that the British processed peas would never be tolerated. Beans of all kinds, gherkins and spinach are popular canned items and are exported in volume.

It would appear that in food matters Britain could benefit from "A Touch of the Dutch"!

I would like to thank the following for their hospitality and assistance during my visit: Dr. A. A. Bos, director, and Mr. J. G. Scherpenisse, chemist, of the Nederlands Verbruikscoöperaties, Utrecht; Mr. J. E. Meihuizen, managing director, Dr. P. Jellinek, chief chemist, and Mrs. I. Wagener, secretary, of Polak's Frutal Works, N.V., Amersfoort; and Dr. J. D. Kuipers, director, and Mr. van Baal, chief chemist, of De Betuwe, N.V., Tiel.

Shortcomings of Food Packaging in India

THE position of the packaging industry in India is what it was in England and other Western countries fifty years ago, according to N. V. R. Iyengar of the Central Food Technological Research Institute, Mysore. Writing in the Institute's *Bulletin*, he reports that the various food industries' planning panels have urged the need for research in packaging foods and the development of suitable packaging materials. To take one example, aerated water bottles produced in India do not have the required mechanical strength and heat resistance. The crown corks do not fit the bottle properly, and the adhesive used between the metal and the cork sheet is not of the right quality. Suitable lacquering materials have yet to be developed for the canning industry. Composite containers and paper packages are not sufficiently moisture-proof and the products do not have the desired shelf-life. The packaging of bulk foods such as sugar, cereals, salt, etc., leaves much to be desired.

The only well-developed industry is can manufacture, though suitable lacquers have yet to be devised. Glass bottles have serious defects, as have the various varieties of paper. One firm is producing transparent cellulose film, but as this is not moisture-proof it is often not suitable for packaging sensitive food and allied products. Jute fabric has been used for many years for packaging bulk produce, but in spite of its high mechanical strength it has the disadvantage of exposing the product to insect and rodent attack and severe humidity conditions. Work at the C.F.T.R.I. has shown that impregnation of jute fabric with insecticides can successfully reduce insect infestation and rodent attacks, and experiments are being made in laminating the jute sacks with heat-sealable cellulose film to give them protection against moisture. Wooden boxes and plywood cases for packing bulk foods are often used but need to be standardised.

Most of the packaging is done by "rule of thumb" as in the use of dry grass mat or sleeves for cushioning delicate wares.

The various industries manufacturing raw materials for packaging in India are setting up laboratories such as the Central Glass and Ceramics Institute, Calcutta, and the Research Laboratories of the Indian Jute Mills Research Association, but there is no organisation to examine and recommend suitable packaging material for the various industries. The C.F.T.R.I. is establishing a research division on packaging and containers to serve the Indian food industry.

Protein Malnutrition

THE term "protein malnutrition" was first used by a FAO/WHO. Expert Committee on Nutrition in the Gambia in 1952, to try and define a process operating in cases of kwashiorkor—which is a more or less rigid clinical definition—and also perhaps in many other cases which would not always be classified as kwashiorkor. During many other sessions and discussions it became clear that in spite of the basic similarity of the protein malnutrition syndrome throughout the world, there were many points on which general agreement had not been reached. In this situation it seemed desirable to arrange a conference at which purely scientific and technical discussions would be held without any necessity for making agreed recommendations. Accordingly, such a conference was held in Jamaica, and the proceedings have now been published.*

Because of the nature of the conference it was felt that the informal techniques developed by the Josiah Macy, Jr., Foundation of New York would be particularly suitable. No formal agenda was adopted at the four sessions held between members of the Food and Agriculture Organisation, the World Health Organisation and the Macy Foundation, which dealt with the biochemistry, pathology, clinical aspects, treatment and prevention of protein malnutrition. It was not intended to cover these fields in detail, since this had been done at previous conferences. The object was to clarify points of difference and to put up new ideas for discussion and challenge: interruption was encouraged, and the discussion was free and unorganised, the Macy Foundation believing that this technique breaks down the psychological barriers to the exchange of information and ideas.

However rich in results, the proceedings of a disorganised conference could make very confused reading, and credit is due to Dr. Waterlow for his excellent editing. The influence of Dr. Fremont-Smith, medical director of the Macy Foundation, was obvious during the first two sessions, when his experience in guiding this kind of discussion and his skill in resolving philosophical tangles was invaluable. Thanks to these gentlemen the book is neither too diffuse nor too cryptically terse. The term "protein malnutrition" is still rather vague, and more information is needed about the nature of the process so that it is possible to determine when it is present and when not. As Dr. Waterlow points out, since malnutrition is a relative and not an absolute effect, this information must in the long run be quantitative. It will be for the reader to judge how far the conference was successful in giving some insight into the nature of the process, and in producing fruitful ideas for future work.

* *Protein Malnutrition.* Edited by J. C. Waterlow. 277 pp. 24 plates. 1955. Cambridge University Press.

Atmospheric-type ingredient water coolers and ice makers are dealt with in the latest of a series of standards developed by the Baking Industry Sanitation Standards Committee, New York. The standard lays down general principles of design and construction for this type of equipment, recommendations for its installation and special conditions for tank and coil type and plate surface ingredient water coolers. Other standards recently published concern dividers, rounders and bun machines, and bread moulders. The booklets are available from the American Society of Bakery Engineers, Chicago, U.S.A.

Colours in Foods: New Proposals

REVISED lists of natural and synthetic colours for use in foods have been published in a supplementary report from the Preservatives Sub-Committee of the Food Standards Committee. The new lists and recommendations have been drawn up after consideration of the views put forward by industry following publication of the first report last January. The main recommendation in that report was that the Public Health (Preservatives, etc., in Food) Regulations should be amended so as to permit the use in food of specified colours only.

In the supplementary report it is stated that the earlier recommendations received wide support but certain sections of the food industry objected to a permitted list and the proposal that added colours should be declared by the manufacturer. The new lists proposed are thought to meet the reasonable needs of U.K. manufacturers. In fact, says the report, already some manufacturers are using only the permitted colours recommended in the first report.

The Food Standards Committee have adopted the new report. Before deciding, in consultation with other Ministers concerned, what action should be taken on its recommendations, the Minister of Agriculture, Fisheries and Food will consider any further representations from interested parties. The Minister will take into account representations already made to the Sub-Committee; it will not be necessary, therefore, for these to be repeated. Representations should be sent to the Assistant Secretary, Food Standards and Hygiene Division, Ministry of Agriculture, Fisheries and Food, Great Westminster House, Horseferry Road, London, S.W.1, to arrive not later than January 31, 1956. Copies of the supplementary report may be obtained from H.M. Stationery Office, York House, Kingsway, London, W.C.2, or from any bookseller (price 9d. plus postage).

The supplementary report, which should be read with the earlier report, reviews the representations which the Sub-Committee have received from trade and other interests. It sets out in greater detail than in the earlier report the Sub-Committee's views on the declaration of the presence in foods of added colour; and it recommends a slightly modified list of permitted colours. In other respects it reaffirms the recommendations in the earlier report.

As regards the list of permitted colours, the supplementary report recommends the inclusion of two additional colours of natural origin, titanium dioxide and ultramarine, and indicates that no objection is seen to the continued use in foods of the other organic colours of natural origin stated to be customarily used in foods.

As regards "coal-tar" colours the latest available data on the colours specifically mentioned in the representations made to the Sub-Committee have been examined by a panel of the medical members of the Sub-Committee. In the light of the latest classifications and the stated need for the colours in question, a revised list of synthetic colours recommended for inclusion in the permitted list is given. The scientific names are expressed in accordance with current British practice. One colour, Baking Brown AW, has been deleted from the list proposed in the earlier report, and a black colour, Black PN, has been added.

Declaration of added colour

The Sub-Committee state that, with certain exceptions, the labels of all foods sold by retail should bear a declaration when colour has been added. In the case of pre-packed foods, the labels of which are required under the Labelling of Food Order to bear a statement of ingredients, compliance with this provision would suffice. For all other foods sold by retail, except meals sold in catering establishments, a statement such as "contains added colouring" should be affixed to, or prominently displayed on, the food when offered for sale.

The list of pre-packed foods, which are at present exempted by the Labelling of Food Order from the need to declare ingredients, has been critically examined. These exemptions should not apply in all cases so far as added colouring is concerned; if colour is added to any of the following foods its presence should be declared:

> flavourings, sausages (but not sausage casings), sauces, home canned fruits and vegetables, compound cooking fat, custard and blancmange powders, baking powder and golden raising powder, jams and preserves, table jellies, soft drinks, fish and meat pastes.

The presence of added colour in smoked fish should be disclosed.

Exemptions from the requirement to disclose the presence of added colour are justified only where compliance with a labelling requirement would present undue practical difficulties to the trade without compensating advantage to the consumer. Exemption might operate in respect of:

> bread, flour confectionery, butter, cheeses, margarine, sugar confectionery, ice cream and other frozen confections.

The presence of added colour in excisable liquors need not be disclosed.

REVISED RECOMMENDED LIST OF PERMITTED COLOURS

COLOURS OF NATURAL ORIGIN

Bole or iron oxide; carbon black; titanium dioxide; ultramarine; and for the external colouring of dragees and the decoration of sugar-coated flour confectionery *silver* or *aluminium* in leaf or powder form.

Dyed aluminium powder may also be used for this purpose provided the colours employed are included in the permitted list.

Caramel; the colour obtained from cochineal; colours of vegetable origin customarily used in foods in the U.K.; the *pure colouring principles,* whether isolated from such natural colours or produced synthetically; and the *aluminium* or *calcium* lakes of any of these colours.

SYNTHETIC COLOURS

Sub-Committee Ref. No.	*Common Name of Colour*	*Scientific Name*	*Colour Index (1924) Number*
1.	Ponceau MX	disodium salt of 1-(2 : 4- or mixed-xylylazo)-2-naphthol-3 : 6-disulphonic acid.	79
2.	Ponceau 4R	trisodium salt of 1-(4-sulpho-1-naphthylazo)-2-naphthol-6 : 8-disulphonic acid.	185
3.	Carmoisine	disodium salt of 2-(4-sulpho-1-naphthylazo)-1-naphthol-4-sulphonic acid.	179
4.	Amaranth	trisodium salt of 1-(4-sulpho-1-naphthylazo)-2-naphthol-3 : 6-disulphonic acid.	184
5.	Red 1 OB	disodium salt of 8-amino-2-phenylazo-1-naphthol-3 : 6-disulphonic acid.	30
6.	Erythrosine BS	disodium or dipotassium salt of 2 : 4 : 5 : 7-tetraiodofluorescein.	773
7.	Rhodamine B	9-*o*-carboxyphenyl-3 : 6-di(diethylamino)-xanthen 3-chloride.	749
8.	Red 2G	disodium salt of 8-acetamido-2-phenylazo-1-naphthol-3 : 6-disulphonic acid.	31
9.	Red 6B	disodium salt of 8-acetamido-2-*p*-acetamidophenylazo-1-naphthol-3 : 6-disulphonic acid.	57

(*Continued on next page*)

Recommended Synthetic Colours *(Continued)*

10.	Red FB	.. disodium salt of: 2-[4-(1-hydroxy-4-sulpho-2-naphthylazo)-3-sulphophenyl]-6-methylbenzothiazole.	225
11.	Ponceau SX	.. disodium salt of 2-(5-sulpho-2 : 4-xylylazo)-1-naphthol-4-sulphonic acid.	—
12.	Ponceau 3R	.. disodium salt of 1-*pseudo*-cumylazo-2-naphthol-3 : 6-disulphonic acid.	80
15.	Rhodamine 6G	ethyl ester of 9-*o*-carboxyphenyl-3 : 6-di(ethylamino)xanthen 3-chloride.	752
28.	Orange G	.. disodium salt of 1-phenylazo-2-naphthol-6 : 8-disulphonic acid.	27
29.	Orange RN	.. sodium salt of 1-phenylazo-2-naphthol-6-sulphonic acid.	26
47.	Oil Yellow GG	a mixture of 4-phenylazoresorcinol and 4 : 6-di(phenylazo)resorcinol.	23
34.	Tartrazine	.. trisodium salt of 5-hydroxy-1-*p*-sulphophenyl-4-*p*-sulphophenylazopyrazole-3-carboxylic acid.	640
35.	Naphthol Yellow S.	disodium or dipotassium salt of 2 : 4-dinitro-1-naphthol-7-sulphonic acid.	10
36.	Yellow 2G	.. disodium salt of 1-(2 : 5-dichloro-4-sulphophenyl)-5-hydroxy-3-methyl-4-*p*-sulphophenylazopyrazole.	639
37.	Yellow RFS	.. disodium salt of 4-sulpho-4′-(sulphomethylamino) azobenzene.	—
38.	Yellow RY	.. disodium salt of 6-*p*-sulphophenylazoresorcinol-4-sulphonic acid.	—
39.	Sunset Yellow FCF.	disodium salt of 1-*p*-sulphophenylazo-2-naphthol-6-sulphonic acid.	—
41.	Oil Yellow XP	3-methyl-1-phenyl-4-(2 : 4-xylylazo)-5-pyrazolone.	—
50.	Green S	.. Sodium salt of di-(*p*-dimethylaminophenyl)-2-hydroxy-6 : 8-disulphonaphthylmethanol anhydride.	737
57.	Blue VRS	.. sodium salt of 4 : 4′-di(diethylamino)-4″ : 6″-disulphotriphenylmethanol anhydride.	672
58.	Indigo Carmine	disodium salt of indigotin-5 : 5′-disulphonic acid.	1180
68.	Violet 5BN	.. sodium salt of 4-diethylamino-4′ : 4″-di-(*N*-ethyl-4-sulphobenzylamino)triphenylmethanol anhydride.	698
69.	Violet 6B	.. sodium salt of:— 4 : 4′-di-(*N*-ethyl-4-sulphobenzylamino)-4″-dimethylaminotriphenylmethanol anhydride.	697
72.	Brown FK	.. a mixture consisting essentially of the disodium salt of 1 : 3-diamino-4 : 6-di-(*p*-sulphophenylazo) benzene and the sodium salt of 2 : 4-diamino-5-(*p*-sulphophenylazo) toluene.	—
73.	Chocolate Brown FB.	the product of coupling diazotised naphthionic acid with a mixture (Colour Index No. 1232) of morin and maclurin.	—
73*a*.	Chocolate Brown HT.	disodium salt of 2 : 4-dihydroxy-3 : 5-di-(4-sulpho-1-naphthylazo) benzyl alcohol.	—
97.	Black PN	.. tetrasodium salt of 8-acetamido-2-(7-sulpho-4-*p*-sulphophenylazo-1-naphthylazo)-1-naphthol-3 : 5-disulphonic acid.	—

The aluminium or calcium salts (lakes) of any of the listed water-soluble colours may also be permitted.

The inclusion of the mixed colours Ponceau MX, Oil Yellow GG, Brown FK, Chocolate Brown FB and of Chocolate Brown HT is subject to verification that these colours can be produced constant in composition.

Starch in Biscuit and Wafer Manufacture

We have received from Latenstein's Fabrieken N.V., of Holland, a pamphlet on "The Application of Starch in Wheat Flour" which claims that the difficulties well known to wafer manufacturers can be diminished and even solved by adding a specially purified wheat starch to the dough.

Wheat starch contains hardly any ferments and by partially replacing wheat flour by wheat starch the capacity for protein and fat break-down in the wheat flour is reduced, thus preventing cracks in the biscuits and reducing the shrinkage of the dough. A partial replacement of the flour by wheat starch, which has a neutral taste and the same gelatination-temperature as wheat flour, reduces the saponification of the flour, thus preventing rancidity—an important factor if the biscuits are to have a long shelf-life.

In the biscuit industry hard wheat flour (Manitoba) is often used. Its high gluten percentage gives it a good water absorption capacity, but its poor water-binding properties cause crazed biscuits. Low grade flours are sometimes added to soften the flour, but as these flours contain many enzymes the danger of deterioration is increased. The addition of a good quality wheat starch overcomes both difficulties and improves the biscuit quality, the leaflet states.

The same advantages apply to the manufacture of wafer. Wheat starch, having the same gelatination-temperature as wheat flour, prevents warped wafer-blades. The addition of wheat starch increases the moisture-binding properties of the batter, facilitating the removal of the wafer from the pans. The pamphlet adds that the absorption capacity of the flour elements of the batter becomes lower. The batter becomes thinner which leads to an easier pumping and a more fluent spreading over the pans. Sudden and local gelatination of the batter is prevented and no rings or flames arise in the wafer-blades. By quick spreading and complete gelatination it is possible to press the top pan as quick as possible, thus preventing "beauty faults" on the underside of the wafer-blade.

Machinery and Equipment

MATURING CHEESE

Cheeses each weighing about 50 lb. are now being matured in batches of 800 with the aid of G.E.C. *Nightstor* heaters installed on the premises of the Barrow and District Farmers Co-operative Society. The heaters operate during the winter, in conjunction with ventilating fans, to dry out the cheeses after curdling and pressing, and provide a dry storage atmosphere while the rind is formed. At the end of the three week curdling and pressing period the cheeses weigh 70 lb. each, this weight being reduced by drying and storage to 50 lb. at the time of despatch.

In the drying room where the cheeses are placed after pressing there are ten *Nightstor* heaters. These heaters consist of a sheet steel casing, finished in bronze in which are mounted centrally placed elements surrounded by a number of fire-brick blocks which are heated electrically during the night, the mass absorbing and retaining heat for emission during the day.

After drying out the cheeses are transferred to a hardening off room, in which six *Nightstors* are installed.

NEW EVAPORATORS

A new rotary film evaporator has been announced by Quickfit and Quartz. It is designed to evaporate heat-sensitive solutions down to small bulk batch quantities up to 350 ml. such as solutions obtained by the Craig counter current extraction technique, and, in certain cases, by chromatography.

The apparatus operates under vacuum and rotates on rollers. The flask containing the original solution is heated in a water bath while the receiver flask is cooled in a freezing mixture. Under these conditions rapid concentration of the thermo-sensitive solution occurs.

Also new in Quickfit is a circulatory cyclone evaporator which, say the firm, has the advantage of rapid circulation and a small working volume (500 ml.). Heat is supplied by means of a coil through which steam is passed.

It is said to be ideal for recovery of inflammable solvents or rapid evaporation under vacuum of heat-sensitive solutions. As the apparatus incorporates a cyclone, it is very effective in stopping entrainment of liquids or solids in the vapour phase. It is fitted with a tap adaptor at the bottom to enable stock liquid to be fed continuously to the evaporator while it is under vacuum.

Handling bags of flour with the Matling straddle stacker. The bags are palletised using two-way reversible pallets.

FLOUR HANDLING

In a flour store handling has been improved by palletising the bags, using 48 in. × 36 in. two-way reversible pallets which are handled by a Matling straddle stacker.

When the flour arrives at the store, the bags are unloaded from the lorry direct on to pallets and then transported and stacked by one man with this machine, as against the old method of manhandling the bags and stacking them individually. The loads are stacked two pallets high. Apart from the obvious saving in space, time and labour, palletisation has an added advantage in that stock checking is greatly simplified.

The straddle stacker has a capacity of 3,000 lb. at 20 in. load centres, and lifts to a height of 9 ft. It is powered by a 175 amp/hour battery, operating a 24 volt constant speed motor. Transmission is through a heavy duty clutch to a gear box providing three forward and one reverse speeds. The battery has sufficient capacity to provide for a normal working shift, and can be recharged overnight without being removed from the machine. The forks are 4 in. wide and can readily be adjusted to suit any pallet width and are always supplied in a length to suit customers' requirements. The straddle legs are also constructed to suit the pallets or stillages in use.

The machine is highly manœuverable. Models can be supplied in other capacities and heights, and can be battery or A.C. Mains powered. Ride-on trucks are also available.

BAG CLASPER

A machine called the *Mubir*, which is claimed to fix aluminium clasps on transparent film bags at a rate of up to 3,000 per hr. has been introduced by a Swiss company. The machine cuts the clasp from an aluminium coil. Pressure on a hand lever gathers the upper part of the bag (up to 15 cm. wide) and closes it with the clasp. Smaller or bigger "fans" may be formed as required.

DUSTPROOF LIGHT FITTINGS

A new dustproof fluorescent lighting fitting has been announced by Benjamin Electric Ltd., to take any standard *Benjamin* reflector for single 80 watt 5-ft. tubes. The company say that internal wiring, gear and contacts are effectively sealed off and no dust can penetrate between the heavy brass lampholders and the lamp. Access to the interior—except by authorised persons—has been purposely made difficult, but the reflector itself can easily be detached for cleaning, by means of special spring-loaded captive wing-nut devices.

The fitting consists of two cast aluminium alloy housings connected by a tube of similar material. The bottom cover of each housing is in two sections, one carrying the moulded rubber cover, protecting the lampholder and wires, the other being removable for the installation of suspensions. The two bottom sections of the gear are fixed by captive screws. One end of the moulded rubber cover houses a heavy pattern brass B.C. lampholder and makes an effective seal on the tube; the other end enters one section of the bottom cover, making a continuous seal between tube and gear housing.

Dustproof fluorescent lighting fitting.

TAPERED BUSHES

For the first time, British engineers have the easy mounting facilities of tapered bushes in chain sprockets. J. H. Fenner and Co. Ltd., announce that *Taper-Lock* bushes have been applied to a standard range of chain pinions and wheels, and that they also have roller chain available. Chain drives for most industrial applications are thus now ready for use, without any re-machining, or the need for skilled fitting.

These bushes are all interchangeable not only in chain sprockets, but in V-pulleys and flexible couplings, and the range of bores is said to make changing from one size shaft to another equally easy and quick. Safety is assured because the bushes mount flush and grip like a shrunk-on fit.

ULTRASONIC MIXING

An ultrasonic mixer, said to be no more complicated either in construction or in application than conventional electric mixers, has been developed by Prof. P. Willems of the Swiss firm Max Wulliman, and is being sold in this country by Scientific Furnishings Ltd.

Known as the *Polytron*, the equipment consists essentially of a rotor and stator, comprising two shallow coaxial cylinders, the walls of which are formed by rings of specially shaped steel teeth. The outer ring is static while the inner is rotated at high speed by a universal motor, the annular clearance between the rotor and stator teeth being small. The design of the system is such that high frequency vibrations of considerable power are generated. Frequencies up to 240,000 cycles/sec. may be obtained with standard models.

The system is claimed to be capable of operation over a wide range from low viscosities of the order of water up to stiff pastes and emulsions. Standard equipment is available up to a motor power of 1·5 K.W. suitable for container capacities of 250 litres. The mounting may be in the top or bottom of the tank, autoclave or other vessel. Cutter heads can be fitted for the direct processing of coarse materials in liquid media into finely dispersed suspensions. More powerful motors are available for special purposes.

Smaller portable models suitable for laboratory application are available in several sizes ranging down to a micro disperser permitting the treatment of minute quantities of fluid in a 12 mm. test tube.

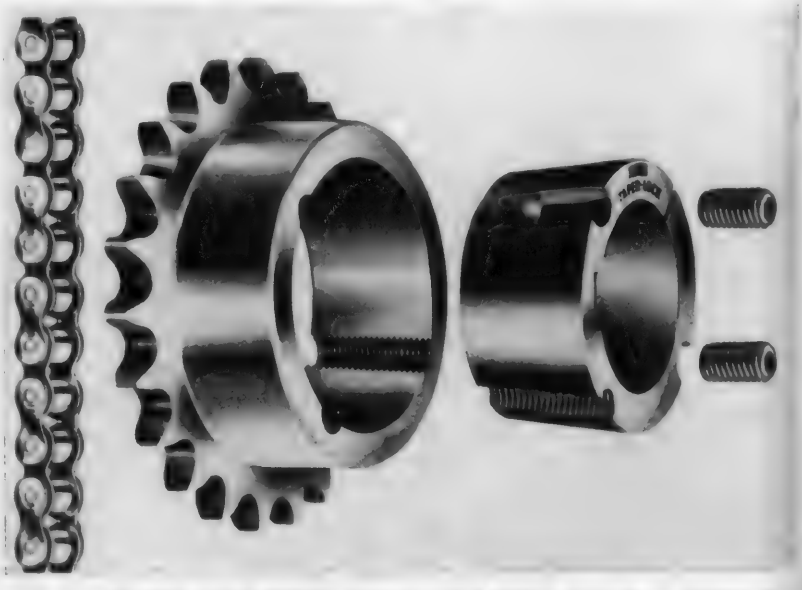
SEPARATOR

About double the output capacity obtained from their standard model is claimed for Russell Construction's new *Streamline* separator. Except that it is very slightly wider, the machine has the same overall dimensions as the standard separator and by an ingenious re-arrangement of the porting the operative screen area has been increased by 23% at the same time maintaining the full gyratory force.

The standard model had an output capacity ranging from 1,000 to 1,500 gal. per hr. according to the type of material in process. It frequently transpired that greater outputs were called for but apparently the Russell will only operate efficiently in one particular critical size of unit so that where larger outputs have to be dealt with a multiplicity of units must be installed.

The new unit is mounted in a heavy box section frame which prevents the escape of the gyratory effects to the static part of the machine, and eliminates the necessity for any special foundation work when erecting the machine.

Easy maintenance has been assured by grouping all greasing nipples on one small tablet conveniently located in the centre of the side panel of the machine.



Said to be the first used in Britain, these tapered bushes have been applied to a standard range of chain sprockets.

News Digest

Windowless Factory for Kraft Foods

WORK has begun in Liverpool on what is thought to be Britain's first windowless factory. It is for Kraft Foods Ltd. and it should be in production by 1957. It will cost nearly £2 million.

Among the automatic equipment to be installed will be the first of its kind in the north of England for the production of 400 packages of sliced, processed cheese per min. The complete range of Kraft products will be manufactured.

Hygiene aids in the new factory will include double filtering of air as it enters the building—the second time through an electrostatic filter. A comfortable working temperature of 65° will be thermostatically maintained throughout the year. Ventilation and lighting systems have been designed so that it will be possible to do without windows, thus avoiding entry of dust and loss of warmth. Double flush doors will be provided and in the production area walls will be tiled from floor to ceiling with rounded corners. About 1,000 girls and 500 men will be employed.

The factory will cover nearly 300,000 sq. ft. on the Kirkby Industrial Estate with a 2,000 ft. frontage on the East Lancashire Road. The building will be of brick on a steel frame. Floors are to be of pre-cast concrete with a dust-free and non-slip surface. The main block will be a single storey high, except for a small section housing special processes. In the same building there are to be large cold-rooms for storing natural cheese. The total cold-store capacity will be 530,480 cu. ft.; the total refrigeration load 318·5 tons per hr. All finished perishable products will be stored in a food cooler until they are shipped from the factory. There will be further warehousing capacity for raw materials and packaging supplies. Every product will be submitted to tests in a special laboratory and quality control department.

The factory will be powered by two boilers of the "Erie City" type, among the first of their kind installed in this country and provided by Davy, Paxman of Colchester. The boilers are of the compact "packaged" design which will enable speedy installation. They will have a full load of 20,000 lb. of steam per hr. and a working pressure of 160 lb. per sq. in. gauge. There will be a base exchange water softening system and also a de-aerator. The boilers are fitted with a Peabody oil-firing system.

The factory has been entirely designed by experts of the Kraft Co. and one of the firm's engineers, Mr. R. M. Anderson, is resident on the construction site. He is working in conjunction with Mr. A. K. Leitch, chief engineer of Kraft Foods Ltd. in England.

Kraft's factory at Hayes will continue in production to supply southern areas.

A.P.V. complete move to Crawley

The final stage in the transfer of The A.P.V. Co. Ltd., to their new works at Crawley, Sussex, was completed towards the end of December when the administrative, sales, technical and drawing office staff moved into the new block of offices. The laboratories moved during November.

The A.P.V. Co. commenced the transfer of their four works in London and Slough towards the end of 1952. The operation was organised in three stages—first the engineering division and the foundries of A.P.V.—Paramount Ltd., then the fabrication division and now finally the administration and staff.

This represents an unusually complex and complete removal of an industrial unit, for most of the 2,000 Works and Office personnel now employed at Crawley have been transferred from London. They have been provided with houses in the Crawley New Town whenever required.

All communications should be addressed to The A.P.V. Co. Ltd., Manor Royal, Crawley, Sussex, Telephone Crawley 1360, except those for the chemical engineering department which will be accommodated, together with the London Office, at an address which will be announced later.

New sweets factory

W. and M. Duncan Ltd., of Edinburgh are laying down a new two-storey block covering 1 acre to take four sugar confectionery manufacturing units, to meet growing demand for these products. Originally chocolate manufacturers, Duncan have expanded steadily in the sugar confectionery field. They now have 1,900 workers and are one of the biggest employers in the East of Scotland.

Scottish confectionery factory

Highland Sweets Ltd., a company formed early last year to manufacture confectionery in the Inverness area will take over the second of two factories which has been approved for the Longman Industrial Estate at Inverness. This estate is being developed by Scottish Industrial Estates, Ltd. on behalf of the Government on part of a former airfield.

"Prefab" ice-cream depot

A prefabricated ice-cream depot has been erected by Wall's on the Sealand Road Trading Estate, Chester.

All of the concrete shell of the building, which is 4,800 ft. sq., together with roof trusses and other structural members were precast on the site from reinforced concrete. The smooth floor, which was laid before any other work was done, served as a "mould" for the walls.

Three thousand cans of ice cream can be kept at a temperature of −15°C. in the depot's cold store. Operating from it are ten vans which distribute ice cream to shops in Chester and district. The manager is Mr. E. J. Lewis.

Quick-frozen fish plant planned

A proposal for establishing low-temperature plants at Wick and Fraserburgh for the quick freezing of herring is being put forward to the Secretary of State for Scotland by Sir David Robertson, M.P. This was intimated at a recent meeting of Wick Harbour Trust when the question of obtaining a suitable building to hold 3,000 tons of fish was considered. The idea is that the Wick plant will cater for herring caught on the northern grounds and Fraserburgh will deal with herring landed from south and Buchan ports.

In a letter to the Trust, Sir David indicated that a building at the harbour would be preferable and if existing premises were not available a new building would have to be constructed. He had in mind the Hydro-Board's generating station at Wick harbour which he understood would soon become redundant.

The chairman of the Trust pointed out that there had been a loss in revenue for the past year of £529 and some such project as that proposed was urgently needed. They agreed to co-operate fully with the M.P.

Sixty kinds of fudge

A small business specialising in the manufacture of fudge has been created by Morocco Fudge, Edinburgh, who have opened a second shop to distribute their products. The firm claims to be the only one in Britain making 60 varieties of fudge, including liqueur fudges.

New instrument factory

The building of Negretti and Zambra's new factory block at Stocklake, Aylesbury has begun. The block is being erected next to the existing building and is part of the development programme for the 10-acre site. It is expected that eventually all production capacity and administrative offices will be situated at Aylesbury.

Brook Motors buy factory site

A 28-acre site, formerly an amusement park, at Hope Bank, Honley, has been purchased by Brook Motors for new factory development. It is about four miles from the Huddersfield works.

The Company has been trying for a considerable time to obtain a suitable building area in Huddersfield but has been finally compelled by lack of sites to go further afield. This particular position was chosen because it is between the Huddersfield and Barnsley factories and will involve the minimum extra transport. As the site is bounded by the Huddersfield/Holmfirth and Huddersfield/Newmill Roads it is likely to be fed from both these approaches.

The factory buildings, expected to occupy initially about four acres, will be devoted to the manufacture of fractional h.p. electric motors. Output will be about half a million motors a year. In construction design and size the new building will be similar to the Barnsley factory opened in May, 1954.

Changes of address

John Gosheron and Co. Ltd., have just moved into entirely new premises to be known as The Packaging Tape Centre, Vauxhall Bridge, London S.E.11.

•

Premier Colloid Mills Ltd., have moved from Belvedere, Kent to larger premises at Hersham Trading Estate, Walton-on-Thames, Surrey, where their telephone number is now Walton-on-Thames 4246.

•

Two years after opening their first Sheffield Office at Oak Dale Road, Honeywell-Brown Ltd. have moved to larger premises at 119, Petre Street, Sheffield 4. Under the management of Mr. W. R. Owen the new office will provide improved sales and service facilities in the Sheffield area.

Batchelor's new quality control room

A new quality control room was opened recently at the Sheffield factory of Batchelors Peas, Ltd.

Large and bright, the room is a self-contained unit in its own building on the factory floor. It is part of the laboratory establishment at Sheffield.

Inside the room, the walls are lined with specially made cupboards and sinks. All production tests are made in one section, under artifical light rather than daylight, thus maintaining uniform lighting conditions throughout the day, an important point in colour tests. Samples are taken of every batch on the production lines, from the raw material to the final stages of processing.

Batchelors operate their quality control system on a "scoring points" basis. From a possible total of 100 points, samples are "scored" for colour, flavour, texture and degree of perfection.

Test samples are also taken in triplicate from time to time—one for product control during its various production stages, one for the Campden Research Station, to which most British canners are subscribers, for a similar check, and one is kept for future reference.

Checks are also constantly made on the filled weights, cooking times and temperatures, the vacuum in the can, the coding on the lid and the standard of the can seam.

Granary extension for Glasgow

A major expansion of granary facilities at Meadowside Quay, Glasgow, at a cost of some £2 million, is planned by the Clyde Navigation Trust. The extension—capable of 50,000 tons capacity—is to be to the west of Meadowside granary, which has a capacity of 46,000 tons. It will have six new suction elevators, four conveyor bands, on an overhead gantry along three berths with eight offshoots to the new building, each capable of taking 400 tons per hour, with two smaller bands to the older building. It will have sufficient flexibility to distribute by bulk or bag to road, rail and water from both buildings. Silos will be mainly of 400 tons capacity with an agreed number of 200 tons; there will be turnover facilities, dust plant, fire protection equipment, additional electric power, and a new quay and shed.

The new scheme will more than double existing capacity and will also speed up the handling of grain cargoes by four or five times.

New frozen foods enterprise

Morcream Products Ltd., the ice-cream manufacturers of Tipton, announce the formation of a new company, Patz Frozen Foods. Partners are the four Pioli brothers: Peter, Pat, B. A., and G. Secretary is R. W. Statham.

Patz Frozen Foods is distributing for the first time a fresh frozen skinless sausage manufactured by Palethorpes. It is claimed that this is the first time that a British sausage manufacturer has supplied sausages for the frozen food trade. Palethorpes pork sausages have been made for over a century.

Patz Frozen Foods have been appointed sole distributors throughout the U.K. The sausages are packed twelve links to a carton and 18 cartons to an outer carton.

This new company is also packing and distributing peas and in the near future will add fish to its frozen food range. Specially refrigerated vehicles are delivering these frozen foods direct to distributors.

News for Importers

"Irish" salmon ban.—Private imports of canned salmon from Eire have been prohibited by the Board of Trade, who say that the concession has been subjected to "commercially organised abuse on a large and increasing scale."

Dried fruits.—The terminal date for the placing of contracts for the imports of dried tree fruits from the U.S.A. (see FOOD MANUFACTURE, October 1955, p. 429) has been extended by the Board of Trade to January 31, and the last date of shipment to March 31. Details are given in Notice to Importers No. 765.

Quotas for 1956.—Licensing arrangements for the global import quotas for the first half of 1956 for goods still subject to the import restrictions imposed in November 1951 and March 1952 are announced by the Board of Trade in Notice to Importers No. 761.

The goods include cake, pastry and pudding mixtures, cocoa powder and chocolate powder, coconut-sugar mixtures, chocolate and caramel spread, honey cream spread, fondant, table jellies, marzipan, canned ham, bacon and pork, edible offals, sugar fat mixtures, sugar-fat-cocoa mixtures, toffee butter, flavoured syrups, apples and pears.

As in previous periods the quotas will be allocated on the basis of trade in a past period and in general the licensing arrangements, the principal countries concerned (the quotas apply only to goods imported from certain non-dollar non-sterling countries, principally in Western Europe), and methods of applying for licenses will remain unchanged.

Applications to import fruit paste will be considered individually.

Lemon juice, in a limited quantity and containing not more than 65% by weight of commercial sweetening material, may be purchased from the U.S.A. with dollars made available under the U.S. Mutual Security Act, by arrangements announced by the Board of Trade. The lemon juice will not be eligible for any American export subsidy.

The arrangements are further to those announced in Notice to Importers No. 679. Details are given in Notice No. 762.

Preserved fruit and vegetables.—Bottled and canned vegetables and certain preserved fruit (except apples) may now be imported without an individual import licence except from the following countries:

Albania, Argentina, Bolivia, Bulgaria, Canada, Colombia, Costa Rica, Cuba, Czechoslovakia, Dominican Republic, Ecuador, El Salvador, Germany (Russian Zone), Guatemala, Haiti, Honduras, Hungary, Japan, Korea, Liberia, Mexico, Nicaragua, Panama, Philippines, Poland, Rumania, U.S.A., U.S.S.R.

Erections and Extensions

Plans have been drawn up by **Cann's Bakery** to erect new extensions to their premises in Sparable Lane, Wakefield, Yorks.

*

Allied Canners, Ltd., Lydiate, Liverpool, will have a new factory erected at Skelmersdale, Lancs, early this year.

*

Three new sugar silos are being erected at King's Lynn, Norfolk, for the **British Sugar Corporation, Ltd.**

*

J. C. Watson, Ltd., plan to have a new factory erected for the manufacture of toffee on a site at Byker Buildings and Rippondean Street, Newcastle-on-Tyne.

*

Bloomfield's, Ltd., ice manufacturers, Ocean House, Gt. Yarmouth, have been granted planning permission to proceed with a scheme for the construction of new works premises in Rant Score, Lowestoft, Suffolk.

*

The erection of new extensions to their factory at Fforestfach Trading Estate is planned by **D. Ayres Jones and Co., Ltd.,** bakery engineers, Lynn Street, Swansea.

Extensions are being erected to the factory of **Lakeland Food Industries, Ltd.,** at Solway Estate, Maryport, Cumberland.

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Fish Meal and Oil Co., Ltd., have had plans approved for the construction of a new factory at North Shields, Northumberland.

*

J. Van Smirren, Ltd., are planning to carry out extensions to their fish canning factory at Tweedside Trading Estate, Berwick-upon-Tweed, Northumberland.

School for sausage makers

Certificates to be awarded to graduates of sausage-making courses were foreseen by Mr. Alex Martin, convener of technical education of the Scottish Federation of Meat Traders. He was speaking at the inaugural lecture of a course, designed to supplement the Federation's apprenticeship scheme, on the technology of sausage production. The course will last two years and will progress from domestic sausages to black puddings, haggis and cooked meats, etc. It is being held at the Clydesdale Technical College and the lecturer is Mr. John Ross.

Bigger demand for better foods

Food consumption during 1955 was at a record high level with a strong demand for the higher qualities from all sections of the community, said the Minister of Agriculture, Fisheries and Food in Parliament recently. He was replying to a question on food prices and the cost of living.

Home-killed and chilled beef is preferred; first quality eggs are selling readily and the demand for the more expensive grades of butter exceeds the supply. On the other hand, consumers have been neglecting the cheaper cuts of bacon and of imported meat; for example, smoked back and gammon rashers are preferred to streaky.

People have been spending more on semi-luxury foods. Expenditure on sweets and ice cream has gone up by about 50% in the last three years and last year totalled about £300 million, compared with £170 million for bread. Sweets consumption is about 25% higher than it was before the war.

In the first twelve months after rationing ended (mid-1954 to mid-1955) household expenditure on food rose by about 11%, whereas prices rose by about 6½%. This represents a real increase in food consumption of 4-5%.

The merits of "middle-men"

We should not be able to claim to be amongst the best-fed nations in the world if it were not for the "so-called army of middle-men," declared Mr. Harmar Nicholls, Parliamentary Secretary to the Ministry of Food, addressing the National Federation of Wholesale Grocers recently. He said that if it were not for the middle-man "more than likely the queues and ration-books would still be with us and the best goods under the counter."

Replying to Mr. Harmar Nicholl's speech, the President of the association, Col. A. A. Johnson, said of wholesale grocers: "We are not only the most essential but also the most economic link between manufacturers and growers on the one hand and the retailer on the other." He went on to criticise the purchase tax of 30%, which, while fitting a metric system of coinage, did not lend itself to the currency structure of this country for ease of calculation, and caused much extra cost in time and effort. Finally, he warned that the cost of motor transport accounted for a large proportion of his members' expenses and, therefore, was adding in no small way to the nation's food bill.

Standards for rubber hose

Revised versions of B.S. 924 and 796 (for natural rubber hose reinforced with woven and braided cotton or rayon) have been published by the British Standards Institution.

COMPANY PROFITS AND PROSPECTS

Horlicks maintain high sales

A high level of sales was maintained by Horlicks Ltd. last year, reported the chairman, Mr. O. P. Horlick, at the annual meeting recently. The group trading profit rose from £710,957 in the preceding year to £957,923. The net profit after taxation was £340,532 (£193,782). In addition to the usual final dividend of 16⅔% a 5% bonus was paid, making a total for the year of 35%.

The handing back of powers to the Milk Marketing Board has enabled the company to use its West Country Dairies in the manner originally intended and the West Somerset Bacon Co. has had another successful year.

*

Foods help raise Glaxo profits

World sales of Glaxo Laboratories Ltd. increased by 8% in value and to a much greater extent in volume in 1954-55, reported the chairman at the company's annual meeting recently. While the increased turnover was widely distributed among the company's many products, its oldest section, the infant food products, played its full part in the increase. The new freedom in the manufacture of and trade in dairy products has so far been to the company's advantage, though they are faced with heavy capital expenditure in re-equipping their food factories at home and abroad with modern machinery. The net profit for the year, after providing for taxation, is £1,476,079 (£1,347,380). The total Ordinary dividend proposed for the year is 12½%, which compares with the equivalent of 10% on the capital as doubled by last year's capitalisation issue.

*

Ups and downs in the tea trade

A sustained effort by Brooke, Bond and Co. Ltd. to stave off increases in the price of tea resulted in losses in the parent company's account of £592,550, announced Mr. John Brooke, chairman of the company at the annual meeting. Group profits are down from £1,199,194, to £337,492. Turnover for the year rose from £68 million to £87 million, mostly due to higher tea prices; the net profit after taxation amounted to only 0.5% on turnover.

Mr. Brooke referred to these vicissitudes as the tea trade's ups and downs. "We were not too badly winded after an exhilarating ride on the tea trade's big dipper," he said, "this form of entertainment is traditional, but for some time past we have been lulled by more gentle movements of loss and gain on roundabouts and swings."

OBITER DICTA

● Roast cook required—Marsham Court Hotel—*Bournemouth Echo.*

● Atom Popcorn Popper Never Too Pooped To Pop.—*Headline in Popcorn Merchandiser.*

● Rutgers University experiments show that hogs gain weight faster if given night lights. —*American Meat Institute.*

● To prevent tears when peeling onions, either bite on a slice of bread or work under a running tap and breathe through the mouth.—*Daily Express.*

● I am very solicitous that the homely banger shall be held in high repute. I shall take every step to ensure it.—*Minister of Agriculture, Fisheries and Food.*

● Tenderness was scored on the basis of the number of chews required to completely masticate a bite of meat of standard size.—*Nutrition scientist at Kansas State College.*

● She forgot her lines in a "live" commercial for icing sugar. She stuck with the sugar icing in her smile and an embarrassing void in words.—*News Chronicle.*

● The action of the Lords Commissioners of Her Majesty's Treasury in freeing stoned dates from import duty shines like a particularly good deed in an incorrigibly naughty world.—*Travers' Circular.*

● When corn flake was first sent to Central Europe, it was rejected by the hungry population who, never having seen that type of food, believed it to be processed onion peels.—*Monthly Bulletin, Di Cyan and Brown.*

● The size of potatoes offered for sale is regulated by a sieve known as a Riddle. Today we have to buy potatoes the size of marbles in the big Fiddle on the little Riddle!—*Vice-chairman of the Cheap Food League.*

● Francis Bacon, the noted 17th century scientist, acting on impulse, stepped from his carriage and crammed snow into a fowl he had just bought. This experiment, a forerunner of refrigeration, proved fatal, as Bacon caught a chill and died the following month.—*I.C.I. advertisement.*

Brewery profits

Sales continued to follow the recent trend, with draught beers showing a small decrease and bottled beers an increase, stated the chairman of Benskin's Watford Brewery in his review at the company's annual meeting. In his opinion these trends are likely to continue. The sales of wines and spirits continue to increase at the same rate as experienced for many years.

The year's operations resulted in an increase of £28,357 to £338,310 in net profit and an 18% dividend (16⅔%).

"Very substantially increased sales" of *Double Diamond* and *John Bull* were reported by the chairman of Ind, Coope and Allsopp Ltd. at the annual meeting. Draught beer sales remained steady. Profits before taxation for the group are £2,322,960 against £1,983,668. Home trade turnover at some 10% above last year was the highest yet achieved.

*

Competitive confectioners

Intense competition in the confectionery industry and inflation in industry generally have caused their trade to become less satisfactory, announced the chairman of Fillery's Toffees Ltd. at the annual meeting. Although the company's home sales were maintained last year at very near the record level achieved in the year before and export sales increased slightly, improvements in packaging and delivery services have increased their costs, and higher operating costs of their distributors had caused them to increase their margins in some respects.

The net profits of the company after taxation amount to £60,029. These are lower than last year's record of £80,401, but are still the second highest in the company's history. A dividend of 20% and a cash bonus of 6¼% were paid.

*

Sugar exports fall

Larger sales of refined sugar in the home market by Tate and Lyle last year were offset to some extent by a fall in exports. Home sales were 1,421,557 tons, an increase of about 10% on the previous year, but exports dropped from 815,708 tons to 690,359 tons. The total of 2,111,916 tons for 1954-55 is an increase of 8,590 tons on the previous year's record tonnage.

Trading profits rose to £4,695,597 (£4,345,358) and the profit, before tax, was £4,249,214 (£4,008,893). A final Ordinary dividend of 12% to make 16¼% for the year was announced.

A Tate and Lyle associated company, Caroni Ltd., reported a 32% increase in trading profits, from £624,000 to £825,000 for 1954-55. Consolidated net profit was £320,852 (£201,009). The chairman said the good results were partly due to a 9,000 ton increase in the sugar crop.

APPOINTMENTS AND RETIREMENTS

MR. F. G. CRABB has been appointed deputy managing director of H. J. Heinz Co. Ltd.

MR. PETER C. T. CLARK has been appointed chairman of George Clark and Son, Ltd., Millwall, London, E.14, the liquid sugar and caramel colour manufacturers.

MR. G. R. BLAKELY has been appointed works director, to G. A. Harvey and Co. Ltd. He joined the company in 1952 as general works manager.

MR. A. W. MCINTOSH of the Transport Department of Van den Berghs and Jurgens, Ltd., the makers of *Stork* Margarine, has retired after being with the company for 40 years.

MR. J. C. FRASER, manager of A. and R. Scott, Uthrogle Mills (Porage Oats), Cupar, has been appointed general production manager with Robert Lawson and Sons (Dyce), Ltd., bacon curers and food manufacturers.

MR. JOHN H. BEALE has resigned his membership of the National Board for Bakery Education and the chairmanship of the Board, owing to the pressure of business and acting upon medical advice.

MAJOR R. H. DOWN, an assistant divisional supervisor in the tea-shops department of J. Lyons and Co. Ltd., recently attended an investiture at Buckingham Palace to receive the insignia of the M.B.E., which he was awarded in the Birthday Honours List for services to the Territorial Army.

DR. J. GREENWOOD WILSON, M.O.H., Port of London, and PROFESSOR H. BURROWE, professor of medicine, Royal Veterinary College, have been elected by the Royal Society of Health as chairman and deputy chairman respectively of its standing committee on the hygiene of food and food equipment for the ensuing year.

MR. E. B. FOSKETT has been appointed to the management of their Glasgow Office by Honeywell-Brown Ltd. Mr. Foskett has spent two years in the company's sales engineering department.

He had previously gained a wide experience in the application of industrial instrumentation and automatic controls. Until recently the Glasgow office was under the management of Mr. D. J. Venning. He left to accept a senior appointment in the company's head office at Perivale, London.

Mr. Peter Clark.

Mr. Eric Jameson.

MR. ERIC JAMESON, sales promotion manager of Alfred Bird and Sons has been appointed sales manager. He will be in charge of Bird's sales force all over the country. Mr. Jameson worked for the Grape-Nuts Co. of General Foods in 1938, to whom he returned at the end of the war. He was appointed group sales manager of Northern Ireland and Scotland for Alfred Bird and Sons Ltd. when this company joined General Foods in 1948. He entered the advertising department in Birmingham as product manager in 1949, and was responsible for the marketing of the company's major products, including Bird's custard powder. He took up the position of Sales Promotion Manager in 1953.

Cleaning agent approved

Another oxidising and preservative agent—*Ryclor*, made by Riley's Chemicals and Colours Ltd.—has been approved by the Minister of Agriculture, Fisheries and Food for cleaning milk tankers, vessels or appliances as an alternative to scalding.

New fruit ice

A new fruit ice on a stick, called *Frutie*, designed initially for the cinema trade, has been launched nationally by T. Wall and Sons (Ice Cream), Ltd. Wall's say the product is made with real oranges and it is being sold in a colourful lined aluminium foil bag at 6d.

Visitor to London

Mr. H. J. Jacob, managing director of Port Huon Fruit Juices Pty. Ltd. and Van Diemen and Co., who specialise in the manufacture of berry juices and concentrated apple juice, will visit London in January. He wishes to see as many firms in the trade as possible while he is in this country. He can be reached through Burnell Hardy Ltd., 35, Cock Lane, London, E.C.1.

Obituary

MR. H. CRAISE, director of Craigmillar and British Creameries Ltd., died on December 6 after a severe illness of two months. Joining an associated company in 1915 he successively served as sales manager and director, and in 1950 was appointed to the board of directors of the present Company for which he was director in charge of the Edinburgh office. Mr. Craise, who was 58, was very well known in the bakery trade, particularly in Scotland where he was born and where he worked for many years. He leaves a widow and two daughters.

Bakery education

Finance and matters of broad policy only will be dealt with by the council of the National Board for Bakery Education Ltd., the new company replacing the old National Board for Bakery Education. Although the new company is to arrange a joint Teachers' Conference with the Ministry of Education and will support the work carried out by other organisations on demonstrations, lectures, addresses, etc., generally it will not take an active part in the arrangements for them.

A new Education Committee has been formed which will ultimately be responsible for diplomas, scholarships, higher technological training, publications, liaison with other organisations, surveys and other educational matters.

New chairman of Canners' Association

Mr. Wallace V. Smedley, head of the Smedley Group, has been elected chairman of the Fruit and Vegetable Canners' Association. He was formerly vice-chairman.

For the past two years, the association has been compiling a Code of Practice for the industry, and Mr. Smedley has been closely associated with this work. The Code, which is expected to be completed this year, will define standards of quality and quantity for canned fruit and vegetables, with sections on labelling, grading, descriptions of contents and advertised weights.

The association is not concerned with retail price maintenance.

Mr. Wallace V. Smedley.

New president of Food Federation

Mr. R. S. Worth, C.B.E., managing director of The Nestlé Co. Ltd., has been appointed President of the Food Manufacturers Federation Inc., from January 1. He has been on the executive committee of the Federation for several years and succeeds Mr. Colin S. Dence, who has just completed his three year term of office.

Mr. Worth commenced work with The Nestlé Company in 1923 as an engineer. He has had lifelong experience in the food industry and became managing director of the U.K. organisation in 1945. For his services to the country in connection with the formation of the Canners' Wartime Association he was awarded the C.B.E. He is also an executive member of the Central Milk Distributive Committee and the National Association of Creamery Proprietors and Dairymen Incorporated, as well as vice-chairman of the Association of British and Dominions Condensed Milk Manufacturers and a member of the governing body of the Cocoa, Chocolate and Confectionery Alliance.

Mr. R. S. Worth.

Forthcoming Events

Society of Chemical Industry

Food Group

January 9. "Management and Food Science," by R. Carr, 6.30 p.m., Chemical Society's Rooms, Burlington House, Piccadilly, London, W.1.

January 18. "Recent Progress in British Research in Fish Technology," by G. A. Reay and C. L. Cutting, 6.30 p.m., King's College, Newcastle-upon-Tyne.

January 19. "The Technology of Milk Condensing," by G. B. Wright, 7 p.m., Station Hotel, York.

January 25. "Nutritional Requirements and Food Fortification, 3: Iron and Calcium," by O. Hollingsworth and E. M. Widdowson, 6.30 p.m., Chemical Society's Rooms, Burlington House, Piccadilly, London, W.1.

Microbiology Group

January 11. Symposium on Anaerobes. Morning and afternoon, Institution of Civil Engineers, Gt. George Street, London, S.W.1.

Institute of Refrigeration

January 5. "Refrigeration Controls," by H. H. Egginton, 5.30 p.m., Institution of Mechanical Engineers, 1, Birdcage Walk, Westminster, London, S.W.1.

January 26. "A Steam-operated Refrigerator Van," by Dr. H. I. Andrews, 5.30 p.m. Venue as above.

Institute of Packaging

January 20. "Considerations in the Choice of a Package," by G. H. Edwards, 6.30 p.m., Grand Hotel, Bristol.

The Leonard Hill Technical Group this month

Dairy Engineering.—Linings for Mild Steel Milk Tanks; How to Cut Steam-Raising Costs—A Hertfordshire Dairy's Oil-Fired Installation; The Dairy Industry in Israel; The Cheeses of Great Britain, 13: Colwick; Liverpool—Last Stronghold of Town Cowkeepers; Getting Eight Pints from the Gallon—The Problems of Milk Measurement.

Manufacturing Chemist.—Chemotherapy and Selective Toxicity, 5: Ionisation Phenomena; Hair-Waving Chemistry; Pharmaceutical Flavours; International Process Licensing; Fine Chemicals for Medical Use; Progress Reports: Analytical Chemistry, Cosmetics and Toilet Preparations, Fertilisers and Plant Nutrients.

World Crops.—World Agricultural Production, 1954-55; Report on the 1955 Smithfield Show; Agricultural Developments in St. Helena; The State of Agriculture in Israel.

Chemical and Process Engineering.—Filtration, 2; Metallurgy; Maintenance Problems with Mechanical Draught Cooling Towers, 2; The Long Term Aspects of Fission Products Disposal; Sulphuric Acid Plant at Whitehaven.

Paint Manufacture. — Manufacturing for Export; Meeting the Needs of Overseas Trade; World Paint Production; The State of British Trade; Oil-Bound Water Paints; Conditions in the Tropics; Supplying the World's Shipping.

Corrosion Technology.—Anti-Corrosive Applications of Epikote Resins; Corrosion Work by British Railways Research Department; Economic Cathodic Protection; Basic Studies in the Oxidation of Natural Graphites.

Petroleum. — Sulphur from Petroleum; Teaching Petroleum Technology at the College of Aeronautics; Copper Tube Drawing in Britain.

Atomics.—Positron Electron Annihilation and Positronium; A Remote Vacuum-Operated Pipette Controller; The Elastic and Inelastic Scattering of Fast Neutrons, 1; Nuclear Reactor Control Systems.

Building Materials.—Salt Glaze Ware for Drainage; Fibre Board for Thermal Insulation.

Food News Overseas

S. African sugar record

Record sugar crops are being produced by South African sugar mills. Officials estimates of the season's output are that it will reach 929,600 tons, valued at about £30 million and 101,045 tons above last year's peak. Once again the Union will be able to meet her export commitments under the Commonwealth sugar agreement and still have enough left to build up a substantial reserve.

Under this year's quota, South Africa was able to export 202,000 tons.

State meat control in S.W. Africa

A corporation to control meat canning factories, abattoirs and cold stores costing about £1·5 million is to be set up in South-West Africa. The ordinance for this purpose was passed recently by the Legislative Assembly.

In effect, the company will control the meat industry in South-West Africa. It will take over South-West African Cold Storage and Stock Farmers and also Damara Meat Packers. The corporation will be financed by the State, but producers will have to pay a levy.

Israeli grapes for alcohol manufacture

Israeli grapes were used for the manufacture of alcohol for the first time last year, the import of raisins which were formerly used for this purpose having been sharply curtailed by tariffs. About 7,000 tons of table grapes will be absorbed by the alcohol distillers. The export of grapes this season has been confined to the sending of trial shipments by sea and air to Gt. Britain and Switzerland.

Big new food plant in Australia

What is said to be the largest food factory in the Southern Hemisphere was opened by the Prime Minister of Australia at Dandenong, Victoria, recently. It has been built for H. J. Heinz Co. Pty. Ltd.

The new factory is built on a 70 acre site and cost over £3 million. Its opening follows closely on the announcement that a new £5 million Heinz factory is to be built at Kitt Green in Lancashire.

The Dandenong plant is of the most modern design and incorporates facilities for the continuous and automatic processing of food products. At first about 500 people will be employed and the number will eventually build up to 1,500.

Heinz started manufacturing in Australia 20 years ago in a converted piano factory.

Bread displaces rice

Within 20 years Japan will displace the United Kingdom as Canada's chief wheat export market, according to a recent statement by Dr. Koto Matsudaira, Japanese Ambassador to Canada.

Dr. Matsudaira based his prediction on the rapid growth of the Japanese population, increasing taste of the Japanese for bread in place of rice and the rapid improvement of Japanese sales to Canada.

Coffee machinery for Nicaragua

Following a survey for the Nicaraguan Development Institute by Mr. Robert Emery of E. H. Bentall and Co. Ltd., several thousand pounds are to be spent by Nicaraguan coffee growers on coffee machinery, including Bentall's *Aquapulpas*, hullers and automatic driers. A demonstration centre is to be set up in El Curezero for research and to provide an example of what can be achieved by modern methods.

Special ships for beef

The first of a fleet of four ships designed to take large quantities of refrigerated and general cargo between Australia and Britain has been completed and is now in Australia. Known as the *Cretic*, the ship has considerable space for carrying chilled meat and is hoped to help further Australia's chances of entering the chilled beef market in the U.K., now dominated by the Argentine.

Champagne at the South Pole?

"Shock-cooled" wines and brandy have been supplied to Australia's Antarctic research expedition.

The wines have been treated by a special technique in which a method of heat exchange was used to precipitate elements that would otherwise turn wine cloudy and cause crystal deposits to form at low temperatures. Even if the wine freezes it will still be drinkable when thawed out. Thus wines may actually be heated to bring them to the correct "chilled" temperature.

Smaller turkeys for British market

A new breed of turkey has been introduced into the Republic of Ireland by the Minister for Agriculture, Mr. Dillon. It is the Beltsville White, intended for the British housewife who wants a small plump bird with a higher ratio of meat to bone, suited to the small modern oven, and one which, because of its weight (10 to 15 lb.), may be bought more cheaply.

The birds were hatched from eggs of the Beltsville White and the Empire White at the Government farm in Abbotstown, Co. Dublin. Over 180 birds were reared and transferred to the Agricultural College, Athenry, where at the age of six months they attained the high standards demanded abroad.

The long-term aim is to produce a bird which will weigh from 8 to 10 lb., dressed and ready for the oven, and which will have sufficient fat in the meat to give a juicy flavour and appetising appearance.

Research on fish flour

In a report on the research which has resulted in the provision of a neutral fish flour from maasbanker, the director of the South African Fishing Industry Research Institute said that early attempts both by the institute and the fishing industry had succeeded in producing flour from white fish. This flour was completely neutral, but unfortunately white fish was not sufficiently plentiful, too costly for the purpose and also in large demand for consumption in its fresh state. The research was then directed to the prolific pilchard and maasbanker of the west coast. Harvested at the rate of 250,000 tons a year in the Cape waters, these fish were cheap, so that it was possible to reduce the bulk of the catch to meal.

Research showed that a satisfactory neutral flour could be produced from pilchard, but which gave bread an unappetising brown colour. Further research is to be carried out with the pilchard, but for the time being the production is dependent on the maasbanker, which yields a flour acceptable to the baking trade and which can be produced on a large scale. It is not claimed that the neutral fish flour made in South Africa is any startling discovery, as the director of the research institute said that it has been produced for years by the leading fishing nations overseas.

New Companies

L. C. Snelling (London), Ltd. (546551.) Mfrs. of and dealers in plant, machinery and apparatus used for bottling, packing and handling beer, ale, stout, cider, wines, spirits, mineral waters, etc. £200. Dir.: L. C. Snelling.

Commonwealth Wines, Ltd. (546628.) Plantation House, Fenchurch Street, London, E.C.3. £10,000. Dirs. not named. Subs.: E. J. Hearn and G. Eakland.

George Lunt (Purchasers), Ltd. (546666.) Bakers, confectioners, bread bread and biscuit mfrs. £100. Dirs. not named. Subs.: L. R. Lunn and J. P. Wilson, Lloyds Bank Chambers, Collingwood Street, Newcastle-on-Tyne.

Bevan and Messum, Ltd. (547434.) 24, St. Mary Axe, London, E.C.3. Importers, exporters, distributors and brokers of, agents for and dealers in fruit, foodstuffs, goods and products, to carry out operations in connection with the grading, storage, canning, bottling and preserving of fruit and vegetables, etc. £2,000. Dirs. to be appointed. Subs.: D. F. W. Bevan and J. D. Messum.

Whittaker Bros. (Rugby), Ltd. (546373.) 5-6, Little Church Street, Rugby. Brewers' agents, bottlers, beer, cider, wine and spirit merchants and importers, etc. £10,000. Dirs.: H. J. and Janet B. Whittaker.

Sleaford Lincolnshire Egg Packs, Ltd. (547905.) Duke Street, Sleaford, Lincs. £5,000. Dirs.: N. H. and Winifred Wright.

Stalham Flour Mills, Ltd. (547096.) Stalham Flour Mills, Stalham, Norfolk. £100. Dirs.: B. C. E. and N. D. Woodrow.

Sherwood Bonding Co., Ltd. (549813.) Coopers and bottlers, bottle makers, bottle stopper makers, warehousemen, wharfingers and carriers, distillers, brewers, maltsters, mfrs. of and dealers in alcoholic and other drinks. £1,000. Dirs. not named. Subs.: C. H. Good and I. F. Shaw, 115, Leadenhall Street, London, E.C.3.

Saunders and Co. (Harrington), Ltd. (549864.) 60-62, Church Road, Harrington, Cumberland. To take over business of bakers, confectioners, jam manufacturers, corn and flour merchants, grocers and provision merchants, carried on at Harrington by Irving Graham, Ltd. £5,000. Dirs.: E. and Blanche Saunders.

Swaine's Bakeries (Croydon), Ltd. (549865.) 87, South End, Croydon, Surrey. £5,000. Dirs.: K. C. and Mrs. P. O. M. Swaine.

C.T.C. Provisions Ltd. (549871.) 44, Gerrard Street, London, W.1. Provision distributors. £500. Dirs.: A. W. Catty and W. F. Tucker.

Norman's (Wellingborough), Ltd. (549873.) Wilbye Grange, Northampton Road, Wellingborough. Bakers and confectioners. £15,000. Dir.: W. G. Norman.

Poultry Distributors, Ltd. (549927.) 109, Gloucester Place, London, W.1. £1,000. Dirs.: J. F. Fishenden, J. F. H. and Eunice B. E. Smith.

Vegebrig, Ltd. (549935.) General and mfrs. agents, producers, mfrs. of and dealers in canned goods. £100. Dirs. to be appointed. Subs.: Jean and T. A. Herbert, 156, Strand, London, W.C.2.

Horsfields Stoneground Wholewheat (1955), Ltd. (554000.) Stone Flour Mills, Worthing Road, Horsham, Sussex. To take over business of millers carried on as "Horsfields Stoneground Wholewheat." £100. Dirs.: C. G. Prewett and D. M. Griggs.

South Caernarvon Creameries (Eggs), Ltd. (554108.) To take over business of an egg merchant carried on at Egg Packing Station, Llandwrog, Caerns, by Glyn Roberts. £20,000. Dirs.: J. E. Roberts, D. Hughes and W. P. Jones.

G.S. Potato Importers, Ltd. (554080.) 21-3, Highweek Street, Newton Abbot, Devon. £100. Dirs.: G. Glanville, W. T. Slader, R. S. Neale and P. Bragg.

Kenneth G. Hayes, Ltd. (554090.) Importers, exporters and wholesalers of foodstuffs for animal and human consumption. £7,000. Dir.: K. G. Hayes, Thames Cottage, Russell Road, Shepperton, Middlesex.

Martin Hillman, Ltd. (554903.) 26, Matlock Gardens, Hornchurch, Essex. To buy, sell, import, export, manufacture, prepare for market and deal in fruits, vegetables, etc. £100. Dirs.: I. R. Hillman and Mrs. P. R. Hillman.

Fearnley's (Mineral Waters), Ltd. (551526.) Kingston Mineral Water Works, West End Road, Halifax. £2,500. Dirs.: S. and S. Cowburn.

Fruit Drinks, Ltd. (551560.) 32, Rainsford Road, Chelmsford, Essex. To manufacture, bottle, pack and deal in fruit and vegetable purées, essences, etc. Power is taken to carry on business of fruit drink and mineral water manufacturers, etc. Dirs.: S. R. and L. F. Magness, D. and L. J. Usher.

Association of Cereal Food Manufacturers, Ltd. (550594.) 18, Austin Friars, London, E.C.2. The property and income of the Association, whencesoever derived, shall be applied solely towards the promotion of its objects. Subs.: Kellogg Co. of Great Britain, Ltd.; Shredded Wheat Co., Ltd.; Quaker Oats, Co., Ltd.; Alfred Bird and Sons, Ltd.

Alfred Wooderson, Ltd. (550547.) 35, Bow Street, London, W.C. Potato merchants, fruit brokers and merchants. £2,000. Dir.: A. T. Wooderson.

Bennetts (Confectioners), Ltd. (550550.) £1,000. Dirs.: H. and Margaret B. Bennett, 313, Upper Richmond Road, London, S.W.15.

Vines Model Dairies, Ltd. (550590.) 14, Spear Road, Southampton. £5,000. Dirs.: W. A. and Ida N. Vine, H. W., R. A., J. W. G., G. D. and P. H. Vine.

Unione Casearia Italiana, Ltd. (550261.) 30, Bridle Lane, London, W.1. Mfrs., merchants, brokers, agents, importers and exporters of goods, in particular, cheese, dairy produce, meat, etc. £1,000. Dirs.: V. Bertoluzzi, V. Zibana and C. Grassi.

Genu Pectin (London), Ltd. (550220.) 19, St. Swithin Lane, London, E.C.4. Mfrs. of and dealers in pectin, fruit extracts, fruit juices, gelatine, spices, etc. £100. Dirs.: K. Pedersen, J. H. Larsen, W. L. Morton and J. Schaller.

Bramalls, Ltd. (550211.) 225a, Newmarket, Louth, Lincs. Bakers, confectioners, etc. £2,000. Dirs.: R. A. Lock, I. M. Ferguson and H. Boch.

From Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C.2.

SEASONAL GREETINGS

We acknowledge with reciprocal good wishes the seasonal greetings sent to us in the form of calendars, diaries, Christmas cards, etc., by our many good friends and, in particular: Aluminium Development Association, Brand and Co. Ltd., British Food Fair, George Clark and Co. Ltd., Canned Foods Advisory Bureau, *The Countryman*, Energen Foods Ltd., the Glass Manufacturer's Federation, Maconochie Foods Ltd., Negretti and Zambra Ltd., Rose Bros. (Gainsborough) Ltd., C. Skerman and Sons Ltd., Tin Research Institute, Ripley Preston and Co. Ltd., Armstrong-Warden Ltd., J. Walter Thompson Ltd., Hyde and Partners Ltd., Nicholls Dorrity Advertising Ltd.

W. J. Bush Players present "Carrington V.C."

For several years W. J. Bush and Co. Ltd. have had the amiable custom of inviting their friends to dine with them at Christmas time and afterwards entertaining them with a play put on by their own dramatic section. Just before Christmas we had the pleasure of accepting an invitation to the 1955 production, "Carrington V.C.," which was staged at the Cripplegate Theatre, Golden Lane, E.C.

The Bush players have a tradition of nearly 30 years of amateur acting and they must now surely rank among the best of their kind in London. Mr. Eric Bush, chairman of W. J. Bush and Co., produced the play and took the leading rôle. He discharged both these arduous duties with tremendous authority. So far as we could judge, he had so inspired his large cast that none of them missed a single trick. The play concerns a court-martial and its success depends almost entirely upon the pace of the production and the skill with which the players take up their cues. In this respect the production we saw could hardly be faulted. Indeed, we thought the players got more out of the play than the authors put into it.

Mr. Bush can be proud of his company—in both senses of the word. By their applause the audience left no doubt of their appreciation of a thoroughly enjoyable evening.

Packaging

Waxed packs for frozen foods

A range of 5-oz. capacity waxed cartons for *Eskimo Brand* quick-frozen fruits and vegetables has been designed by the Metal Box Co. Ltd. The cartons are for Grimsby Frozen Products Ltd., and are intended for quick-frozen raspberries, strawberries, green peas, broad beans, and sliced green beans. Four-colour printing by Metal Box's *Lithesk* method is used to reproduce a natural colour photograph on each carton of the fruit or vegetable as a background against which the brand name and trade mark of each variety is boldly imposed. The cartons are overwrapped in grade MSAT heat-sealable cellulose film.

Five ounce waxed cartons for quick-frozen fruits and vegetables produced by the Metal Box Co.

Multi-colour fish wrapper

Evidence of the increasing popularity of quick-frozen fish is provided by the appearance of a new pack of *Coastal Fillets* produced by Macpherson Train and Co. Ltd., for the export trade.

The pack consists of a carton overwrapped in protective and multi-colour printed *Diophane* cellulose film. Appropriately the contents of the pack and the brand name are predominating features of the colourful wrapper, which includes an excellent half-tone reproduction of the fish when fried and garnished with parsley. The illustration of the fish is overlapped by a distinctive white panel overprinted in red and black bearing the brand name and description.

The Quick Freezing quality *Diophane* wrapper was designed, made and printed by Transparent Paper Ltd.

Photogravure cartons are being used by J. Lyons and Co. Ltd., for their *Kup Kake*. The attractive four-colour design of the carton was originated by Kathleen Darby and executed by the design section of Lyons. The carton itself was produced by Hunt Partners Ltd., using their *Velvetone* process.

French plastic packing project

Plastics packaging materials are to be made by a new company formed by the largest tinplate producer in France, Etabl. J. J. Carnaud et Forges de Basse-Indre.

To date Carnaud has only produced tinplate containers and boxes, mostly for canned food. The new firm known as Carnaud Plastics is also to manufacture plastics accessories which would combine with metal, cardboard and other packaging materials.

Carnaud is the second big supplier of commodities used for packing and containers in France to take advantage of the new markets opened by plastics. Some time ago, a group of prominent jute manufacturers set up a company to produce plastic sacking and packings.

Welded aluminium cans

A food can with an aluminium coating instead of tin, and with side seams that are welded instead of soldered, has been introduced by the American Can Co.

Dr. Randall Royce, manager of the company's research laboratories at Newark, N.J., claimed that the welded side seams "not only eliminated the use of the tin and lead solder," but also provided much stronger cans than conventional soldered types. "They are so strong that under test conditions the steel walls of the cans break before the welded seams separate." The aluminium coating on both bodies and ends provided a durable finish that gave even better protection than tin to the outside of cans, Dr. Royce said. The inside of the cans were lined with special enamel coatings designed to give added protection to specific canned products, he added.

The new welded can was developed by the company as part of its "Operation Survival" research programme which has as its goal the complete elimination of tin and other strategic, "hard-to-get" raw materials from metal containers for all types of products.

A standard Venesta plywood barrel—size 30 in. high by 20 in. in diameter—complete with a polythene bag liner filled with fruit pulp, ready for sealing and storing. The lid fits inside the top band and is secured by swivel clamps.

Plywood barrels for fruit pulp

Lower costs, less wastage and easier, cleaner handling are the advantages of using plywood barrels plus a polythene liner instead of stave casks for the storage of fruit pulp, according to Venesta Ltd., who have recently completed comparative tests. They claim that the new barrels prevent loss by seepage; are durable and require no attention from coopers; are initially cheaper and cost less to maintain (the polythene bags being very cheap and easy to renew); and are easier to handle—due to the vertical rigidity of the barrels they may be stacked to a considerable height.

While it is possible to supply plywood barrels of the same capacity as the stave casks previously used, in fact smaller standardised sizes have proved more satisfactory. These smaller barrels are easier to handle and, in addition, give closer control of the quantity of fruit to be processed at any given moment—an important factor in eliminating waste.

Booklets Received

★A new folder provides full information on the Benjamin Flurolier continuous channelling system for fluorescent lighting. It is available free from The Benjamin Electric Ltd.

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★Fire prevention by radioactive detection of smoke particles is described in a new booklet published by the Minerva Detector Co. A lucid explanation is given of how the process works, together with the results of tests, and a diagram of a typical installation. The activating source of the detector is a particle of radioactive material, said to have a theoretical life of more than 1,000 years.

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★" Merchandising Vision " is the title of a new house journal published by British Cellophane Ltd. Brightly produced, the first issue contains articles on foods packed in *Cellophane*, particularly featuring Heathpack Ltd., who supply *Cellophane* wrapped fruits and vegetables. Two other new booklets from the company deal respectively with polythene film and the packing of biscuits.

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★Details of all their instruments for the measurement, recording and control of humidity in industrial applications are contained in a new folder produced by the Cambridge Instrument Co. Ltd. A special feature is made of the Cambridge recorder with wet and dry thermometers, which is said to be particularly valuable for use in connection with the preservation of foodstuffs.

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★Said to be the original vertical unit construction pump forming a complete accelerator which requires neither bypass nor non-return valve; the range of floor-mounting *Fullway Mopumps* is described in a new leaflet produced by Rhodes, Brydon and Youatt Ltd. The pumps are permanently aligned and easy to install. They stand on their own base and the unit needs only to be brought into line with and coupled up to the heating pipes.

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★Roman myths and Persian legends have been combined by Gordon Edgell and Sons Ltd., the Australian canners, to create a fanciful character called " Edjinn," whose home is said to be among Edgell's asparagus plantations. Edjinn (and his family of Edgelfs and Edgeleves) introduce a book designed to give the public simple facts about food preservation and canning. Can fabrication, sterilisation, processing and other cannery operations are described and the booklet ends with a vitamin chart and a collection of canned food recipes.

At the ladies' night of the Executives' Association of Great Britain, guests were received by the chairman, Mr. Frank J. Clarke. Mr. Clarke, who represents the dairy, ice cream and food engineering industries on the Association, is seen here with Mrs. Clarke accepting the bouquet.

Trade Marks

APPLICATIONS

VITACHOC.—737,324. Chocolate couvertures for the bakery and confectionery trade. **Vitacream, Ltd.**, 48, Mark Lane, London, E.C.3; Manufacturers and Merchants.

WIMSAY.—737,278. Edible oils and edible fats. **Preston Meatworks Pty., Ltd.** (a joint stock company under the laws of Victoria, Australia), 50, Oakover Road, Preston, Victoria, Australia; Manufacturers. Address for service, c/o Markby, Stewart, Wadesons, 5, Bishopsgate, London, E.C.2.

ZULU CHIEF.—735,032. Non-medicated confectionery. **Chix Confectionery Co., Ltd.**, 15D, Argyle Street, Trading Estate, Slough, Bucks; Manufacturers and merchants.

SONIC.—735,950. Meat extracts, dried fruits, dried vegetables, jellies (for food), dried eggs, dried milk, dairy products (for food), edible oils and edible fats, and 735,951. Coffee, tea, cocoa, sugar, rice, tapioca, sago, preparations of acorns, barley, chicory and malt for use as substitutes for coffee; and flour, cereal preparations for human consumption, yeast, baking powder, salt, mustard and pepper. **Sonicmill, Ltd.**, Sonic Mill House, Pottery Street, London, S.E.16; Manufacturers and merchants.

SHANDON BELLS.—742,838. Canned fruit and vegetables. **The Co-operative Fruit Growers' Society, Ltd.** (incorporated under the laws of Ireland), Dungarvan, Co. Waterford, Eire; Manufacturers and merchants.

BULLFINCH.—743,895. Butter. **Slade and Co. (Bristol), Ltd.**, 31 and 33, Temple Back, Bristol; Wholesale provision merchants.

NYMPHEA. — 744,017. Canned fish. **Napier, Brown and Co., Ltd.**, 23 and 25, East Cheap, London, E.C.3; Merchants.

KREEMY.—713,899. Toffee. **Edward Sharp and Sons, Ltd.**, Kreemy Works, St. Peters Street, Maidstone, Kent; Manufacturers.

SMASHER BAR.—B729,096. Liquorice flavoured toffee in the form of bars. **Mackay Bros. (Confectioners), Ltd.**, 146, Fountainbridge, Edinburgh, 3; Manufacturers.

BREADLAC. — B741,475. Bread improvers having a milk powder base. **The New Zealand Co-operative Dairy Co., Ltd.** (a joint stock company organised under the laws of New Zealand), Dairy Place, London Street, Hamilton, New Zealand; Manufacturers.

SPREE.—B737,184. Non-medicated confectionery. **Mazawattee, Ltd.**, 50, Thomas Road, London, E.14; Manufacturers and merchants.

SUBITO.—715,801. Swiss cheese. **Roothlisberger and Co.**, Bahnhofstrase 27, Herzogenbuchsee (Berne), Switzerland. Address for service, c/o William B. Sigerist, 110, Cannon Street, London, E.C.4.

SUN - JOY.—735,332. Non - alcoholic drinks and preparations for making such drinks. **Robertson Fruit Products, Ltd.**, 44 and 46, Tait's Lane, Dundee; Manufacturers.

SUNNY HOURS.—726,536. Jams, preserved and cooked fruits. **John Mawdsley, Ltd.**, Premier Preserve Works, Princess Street, Wigan, Lancs; Manufacturers and merchants.

TATTERJACK.—739,397. Potato crisps. **A. T. Robinson, Ltd.**, 10, Rumford Street, Belfast, Northern Ireland; Manufacturers and merchants.

THREE STRONG MEN.—738,987. Beer, ale, stout and porter. **Mackeson and Co., Ltd.**, Brewery, Chiswell Street, London, E.C.1; Brewers.

TOFFOLATE.—738,321. Non-medicated confectionery. **A. S. Wilkin, Ltd.**, Cremona Park, Benton Road, Newcastle-on-Tyne; Manufacturers.

TOP HAT.—737,156. Meat; fish, poultry and game; meat products, fish products, game products and poultry products, and preserved, dried, cooked, bottled or canned vegetables. **Brian Jenks and Co., Ltd.**, Sabian House, 26-27, Cowcross Street, London, E.C.1; Merchants.

TOWN HALL.—738,404. Cheese. **Triocean, Ltd.**, 45, Borough High Street, London, S.E.1; Merchants.

TREBOR GAY GORDANS.—737,757. Non-medicated sugar confectionery and chocolate. **TREBOR LOVELIES.**—738,153. Non-medicated sugar confectionery. **TREBOR LOVELY LOLLIES.** 738,154. Lollipops being non-medicated sugar confectionery. **Robertson and Woodcock, Ltd.**, Trebor Works, Katherine Road, London, E.7; Manufacturers.

ELMETE.—B742,029. Sausages and cooked meats. **Yorkshire Farmers' Bacon Factory (1932), Ltd.**, Sherburn-in-Elmet, Leeds; Manufacturers.

PAYDAY.—742,560. Non - medicated confectionery, but not including biscuits or any goods of the same description. **Mazawattee Confectionery Co., Ltd.**, 50, Thomas Road, London, E.14.

Information and Advice

This Service is available to subscribers to Food Manufacture. If a stamped addressed envelope is enclosed replies will be sent by post, but enquiries cannot be answered by telephone.

Luncheon meat

B.7617. *We would like information on the manufacture of a high-class pork or pork and veal luncheon meat.* (London, E.15)

We suggest the following as a basis for experiment:

	lb.
Lean veal	8
Lean pork	2
Ham fat	2½
Fine dry rusk	2
Water	3

Seasoning

	oz.
Ground white pepper	1¼
Ground mace	½
Smoke powder	½
Ground ginger	½
Rubbed green parsley	½

Break down the veal and pork on a plate and dry-cure with 4 oz. salt, 1 oz. sugar, ½ oz. saltpetre. After curing, transfer the meat to a bowl chopper, add spices, soaked rusk and finally the fat. Fill into a suitable container and cook at 170°F. for 1 hr.

This recipe is for an open pack product. If you wish to can the meat you should subject the cans to a temperature of about 240°F., the time being dependent on the size of the cans.

Filling jam in large tins

B.7615. *For years we have had difficulty in filling 28 lb. tins with jam. If we fill them from bulk containers at a temperature before setting can take place (175°F.) and leave them to stand until cool before putting on the lid, the jam burns in the centre. We are therefore forced to use a very wasteful method of laying out our tins over a large area and putting in an amount of 9 lb. 4 oz. at a time. At each filling this is allowed to stand, set and cool before the next one. We have tried filling the tins at a pre-set figure of 175°-180°F. and immediately subjecting the tin and its contents to a cabinet at 55°F., but this only exaggerates the previous trouble of cooking the centre of the jam.* (Slough)

The problem of cooling jam in 28 lb. tins is a common one. The most satisfactory process is a combination of pre-cooling and fractional filling. A very suitable cooler, consisting of a double-jacketed cooling tank, is manufactured by Wm. Brierley, Collier and Hartley. After boiling, the jam is discharged into this tank and kept there until it reaches a temperature of approximately 180°F. From this tank supplies are drawn into a receiving tank, from which 28 lb. tins are filled either mechanically or by hand, in units of 14 lb. at a time. The units should be left to cool for not less than 20 min. before filling up to 28 lb.

It is of great advantage to use mechanical blowers which ensure efficient air circulation between the 28 lb. tins while they are cooling. Caramelisation should not occur if care is taken.

Information supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery and materials and also general information as follows:

B.7635. *Suppliers of cocoa powder in bulk.* (Trinidad)

B.7636. *Makers of machines for drying hands by hot air.* (Boston, Lincs.)

B.7637. *Manufacturers of lard packing machine.* (Chesterfield)

B.7638. *Advice on preserving dried turtle meat.* (London, E.C.1)

B.7639. *Extraction of oil from cashew nut shell.* (Manchester)

B.7640. *Advice on preventing distortion of labels on canned goods.* (Pakekohe, New Zealand)

B.7641. *Suppliers of yeast powder.* (Marcq-en-Barœul, France)

B.7642. *Makers of factory stool.* (Leicester)

B.7643. *Manufacturers of coffee roasting equipment.* (Peterborough)

B.7644. *Manufacturers of coding machines for cans.* (Co. Tipperary)

B.7645. *Recipes for chewing gum and lemonade powder.* (Karachi)

B.7647. *Publications on smoking fish.* (Lamberts Bay, South Africa)

B.7648. *Buyers of fruit pulp for resale to canners.* (King's Lynn)

B.7650. *Information on canning pineapple juice.* (London, S.E.13)

B.7651. *Manufacturers of automatic food and drink dispensers for factories.* (Manchester)

B.7652. *Advice on canning creamed rice puddings.* (Maldon, Essex)

B.7653. *Recipe for synthetic ice cream.* (Montreal, Canada)

B.7654. *Information on use of gluten in foods.* (Stockport)

B.7657. *References to enrichment of wheat flour.* (Philippines)

B.7658. *Literature on the manufacture of soft drinks.* (Dublin)

B.7659. *Manufacturers of vacuum filling machines for use with hot syrup.* (Stowmarket, Suffolk)

B.7660. *Manufacturers of sugar mills for icing sugar.* (Cork)

B.7661. *Suppliers of sealing machine for "Cellophane" bags.* (Hull)

Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

741,357. LESME, LTD.: Heat treatment of chocolate and chocolate couverture.
741,147. ROSE BROS. (GAINSBOROUGH), LTD.: Machines for labelling bottles.
741,163. WOLFF AND CO., K.G.: Method of improving the adhesion of synthetic sausage casings to the filling.
741,335. UNITED DAIRIES, LTD., and J. E. KING: Apparatus for emptying containers.
741,405. SMITH AND WELLSTOOD, LTD.: Combined mincer and mixing machine.
741,871. BUTTNER-WERKE A.G.: Process and apparatus for the continuous lixivation, extraction or the like of vegetable matter.
741,941. DE LAVAL SEPARATOR CO.: Production of cheese.
741,890. L. E. HUMPHRISS: Calculating device for use during the preparation of mix batch recipes for comestibles.
741,768. S. STEPHAN: Meat cutters.
741,977. COPE, WHELON AND CO., LTD.: Stripping of poultry.
741,799. N. ANDREASSEN: Machines for skinning fish fillets.
740,742. ANSTALT UNDA: Apparatus for manufacturing artificial skin structures, such as sausage casings from animal skin material.
740,745. R. A. S. TEMPLETON: Methods of and machine for treating food and other substances.
740,618. CAMWHEAT PIE MACHINE CO., LTD.: Pie moulding apparatus.
740,630. ALLEN CHLOROPHYLL CO., LTD.: Vegetable material.
740,711. R. A. S. TEMPLETON: Manufacture of potato mash and like powders.
740,488. C. REID: Vegetable food substance and process for preparing same.
740,786. A. SCOLARI: Roasting coffee.
740,596. E. BROOKS: Vegetable-paring machines.
741,412. S. A. FRANCAISE POUR LA SEPARATION L'EMULSION ET LE MELANGE PROCEDES S.E.M.: Method and means for forming chocolate pastes.

ABSTRACTS OF BRITISH PATENTS

Bottling liquids

A method of introducing a preserving fluid into a filled bottle, comprises the steps of applying to the filled bottle a closure having a self-sealing aperture, exhausting the air pocket in the neck through the aperture, and introducing a preserving fluid under pressure through the aperture to fill the space between the closure and the top of the liquid.—738,015. *J. N. Wiser.*

Milk tablets

Milk tablets, which are said to have an attractive appearance which is retained on storage, are produced by coating roller-dried skim or separated milk powder with an aqueous emulsion of hydrogenated fat or hydrogenated fatty oil prior to subjecting the powder to tableting.—738,755. *Aplin and Barrett, Ltd.*

Confectionery machinery

A filling machine for the production of stuffed caramels incorporates a dispenser or distributor having a rotor carrying adjustable, slidable vanes. The disadvantages of a machine employing gears (which tend to crush granular materials) are claimed to be eliminated.—738,898. *Macchine Industria Dolciaria Carle and Montanari.*

Cellulose-cased foods

A stuffed, moisture-containing food product comprises a thin casing of a non-fibrous hydrophilic cellulosic material, all portions of the outer surface of the casing, including any folded and wrinkled portions thereof, having firmly self-adhered thereto a non-tacky film of a water-insoluble, polymer, *e.g.* polybutadiene rubber. The composite casing has a specified thickness and has a specified low moisture transmittancy.—738,036. *American Viscose Corp.*

Sugar beet extraction

Juice extracted from sugar beet sections in a vertical diffusion tower, is enriched by continuously withdrawing juice from the lower part of the tower, mixing it with sections to be extracted, and pumping the mixture to the tower. Before the mixture enters the tower, a part of the juice contained in it (in an amount corresponding to the amount of extraction liquid introduced into the tower) is separated from the mixture and is used for pre-heating fresh sugar beet sections, after which it is treated in a known manner to produce sugar. An apparatus is claimed.—738,025. *Pfeifer and Langen Koln and Braunschweigische Maschinenbauanstalt.*

Treating brewers' worts

A method of treating brewers' worts comprises continuously passing the sweet wort from a mash tun to a fermentation vessel as hopped wort, and in the course of that movement, heating the wort to a high temperature, holding the wort at that temperature, then reducing the temperature and passing the wort to a hop extraction vessel; passing the hopped wort to a sedimentation vessel and thence through a sludge-separating device to a cooling device and finally delivering the cooled hopped wort to the fermentation vessel. The copper is dispensed with and easy control of the process is facilitated.—737,782. *A.P.V. Co., Ltd.*

Food packaging unit

A food container for baked goods is manufactured from metallic shape-holding, but readily deformable material (*e.g.* thin aluminium) and has formed along the upper edges of the side walls a seat for a cover with a rim extending upwards from the seat. A cover, with a relatively rigid marginal area, is placed on to the seat and held in position by folding the rim inwards on to it.—738,104. *Ekco Products Co.*

Coffee preparation

A preparation for addition to a coffee beverage to overcome the harmful effect of the caffeine present, consists of a mixture of sugar with a minor amount of albumen.—738,818. *M. Ruben.*

Non-adhesive bread pan

The inside surface of a baking pan is rendered non-adhesive by treating it with a solution of an epoxy resin and a hardening agent and then heating the surface. The pans have to be re-treated only occasionally.—738,371. *J. N. Read.*

ABSTRACTS OF FOREIGN PATENTS

Artificial rice

A dough consisting of 2 kg. flour, 1 kg. of soya bean flour, 1 kg. potato flour and 1·5% aqueous solution of sodium salt of cellulose carboxymethyl ether containing 40 mg. each of vitamin B_1 and B_2 and 50 g. calcium lactate is moulded with pressure, steamed for 5 min., and coated with a 20% aqueous solution of polyvinyl acetate solution or collodion and dried to give 5·4 litres of artificial rice.—Japanese 4,170.

Container for food irradiation

A container for the heat-treatment of foods and other materials by high-frequency irradiation is made from a thermoplastic polymer, e.g. *Araldite*, the metallic rim of the container being bonded to it by the polymerisation reaction and the cover plates being soldered to the rims.—French 985,080 (through *Chem. Abst.*).

Improving baking capacity of wheat flour

Wheat is ground in the usual manner. Part of the grit or flue dust detached during the grinding process is pressed into flakes which are treated for 8-10 min. with moist hot air at 70-80° and then recycled to the grinding mill in order to combine them with the flour. The conversion of grit or flue dust to flakes can also be effected after the heat treatment. By this means, the baking capacity of the flour is improved and the dough volume and output increased.—*German* 826,732.

Improved sausage casings

Losses of sausages caused by the adhesion to cellulosic casings during removal of the casing are prevented by rendering the interior wall of the casing hydrophobic by treating it with an isocyanate or ethylenimine containing a fatty acid radical. The interior walls of casings made from viscose or collodion are rinsed with a 1% emulsion of octadecyl isocyanate. After removal of excess treating agent by squeezing, the casing is passed through a bath consisting of a 5% glycerol solution and then dried. N-octadecylethylenimide may be substituted for the isocyanate.—*U.S.* 2,709,138.

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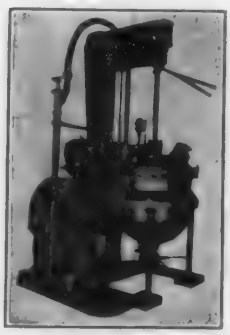

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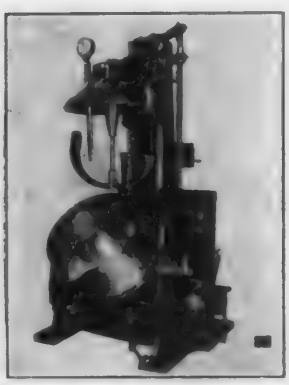

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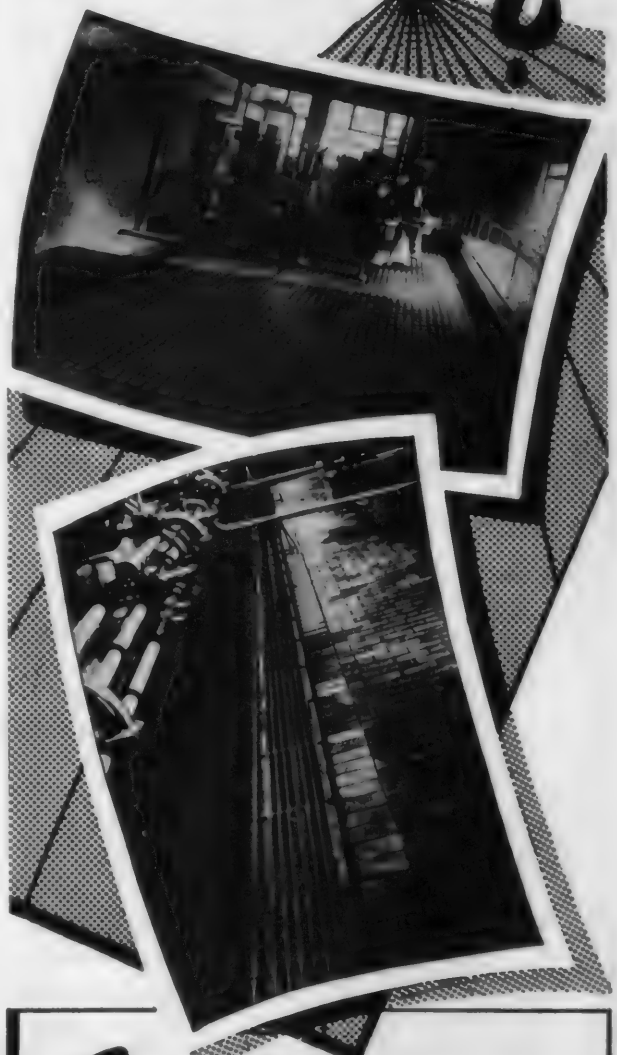

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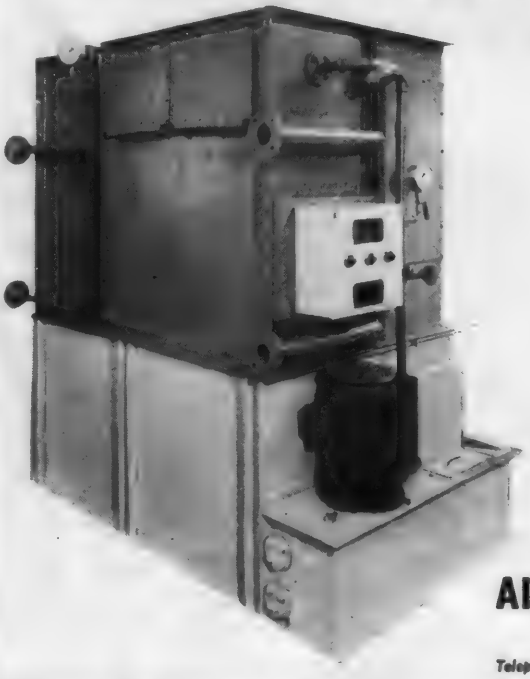

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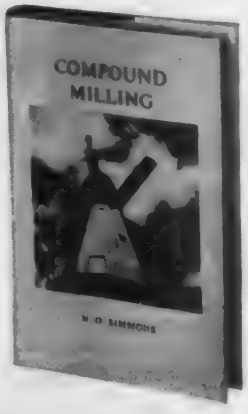

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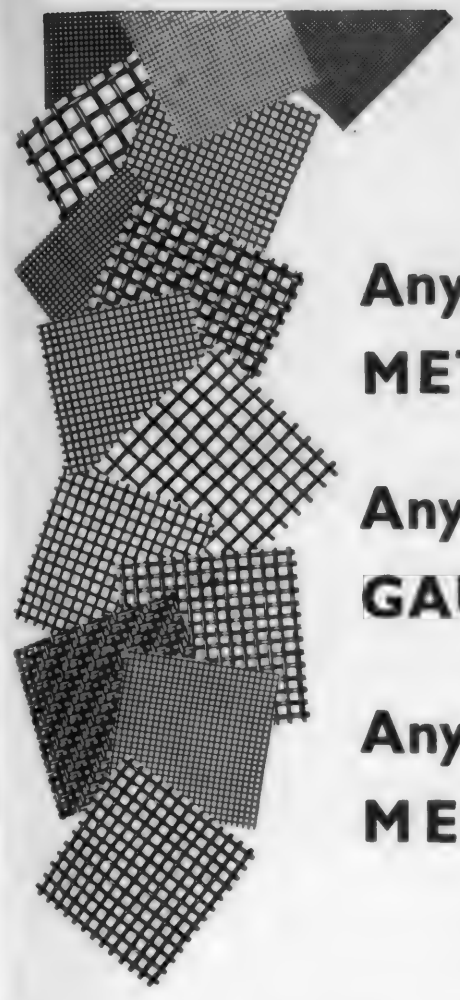

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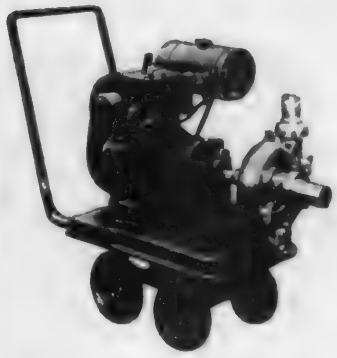

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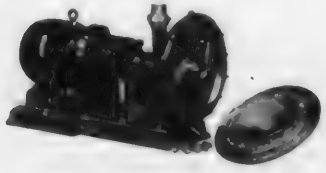

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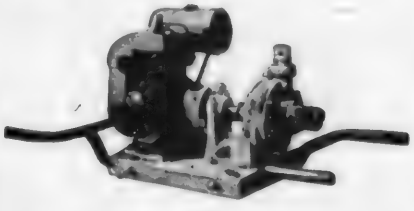

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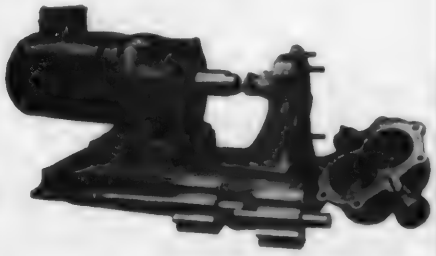

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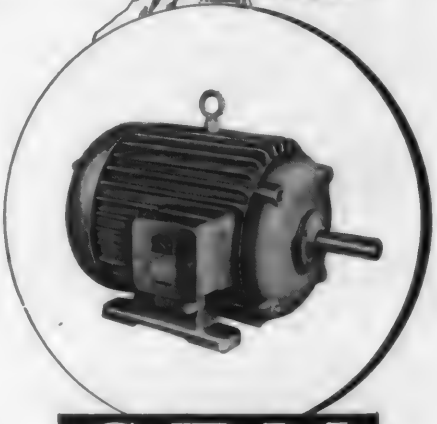

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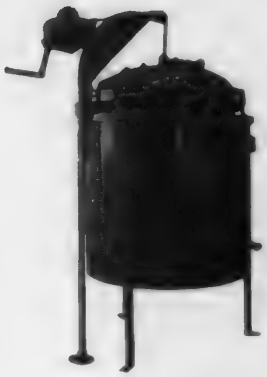

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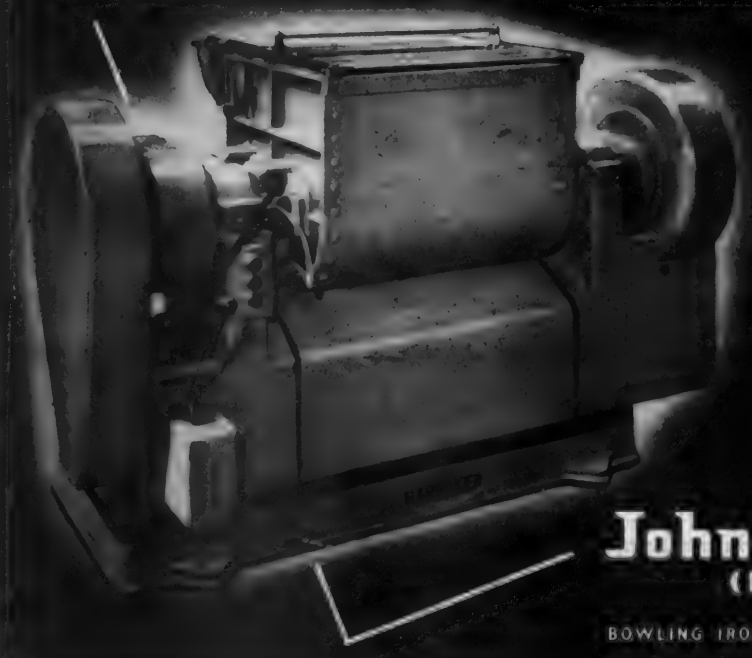

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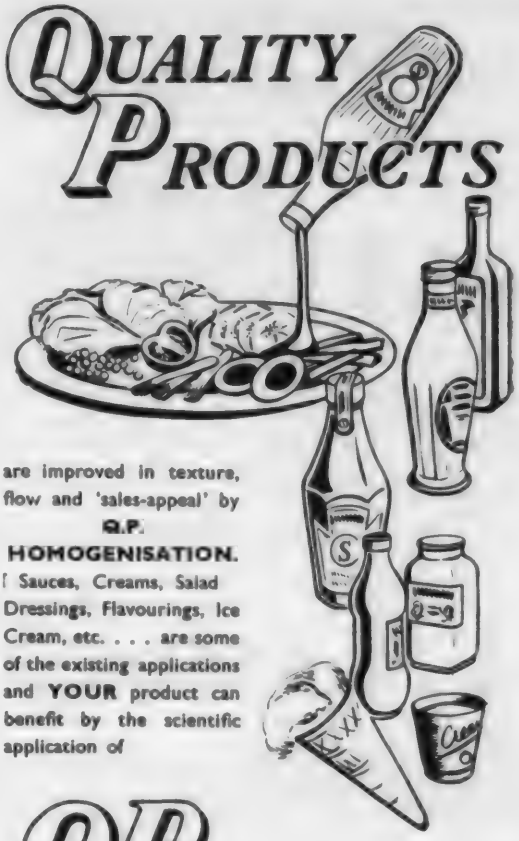

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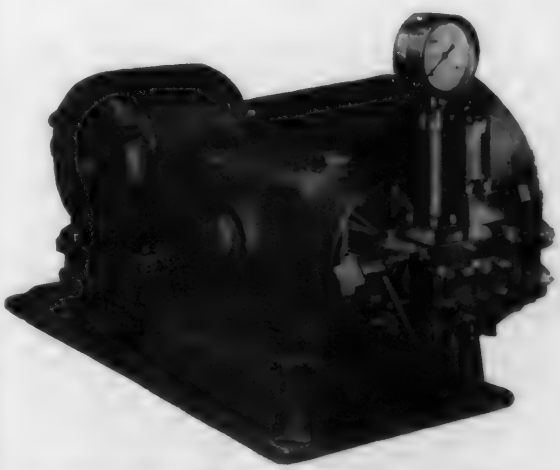

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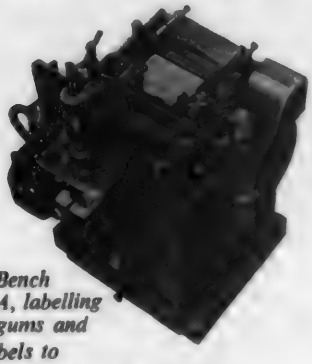

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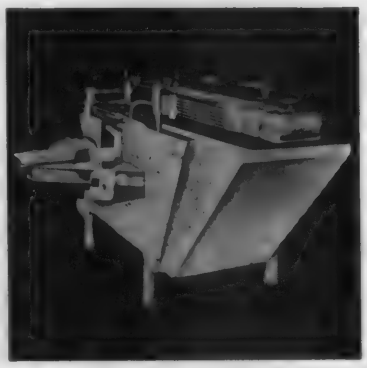

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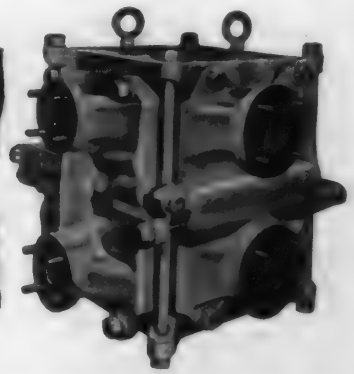

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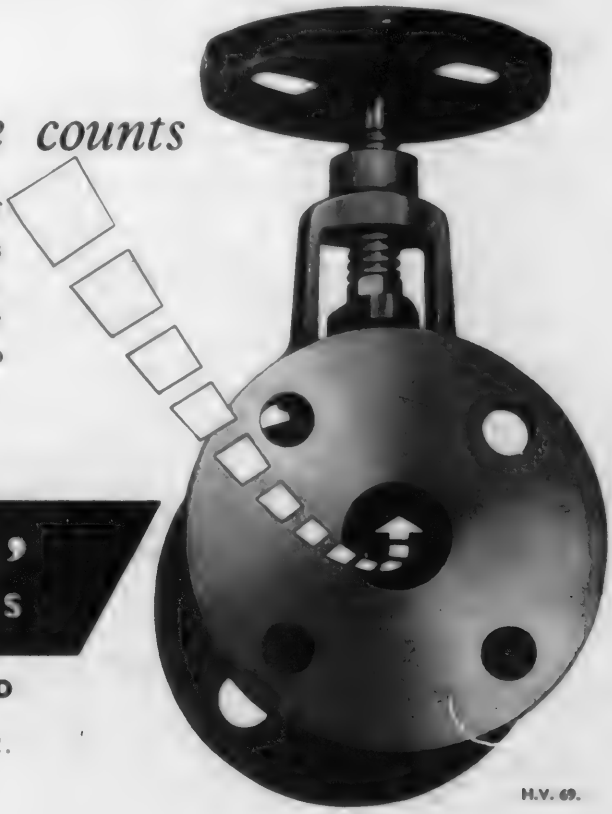

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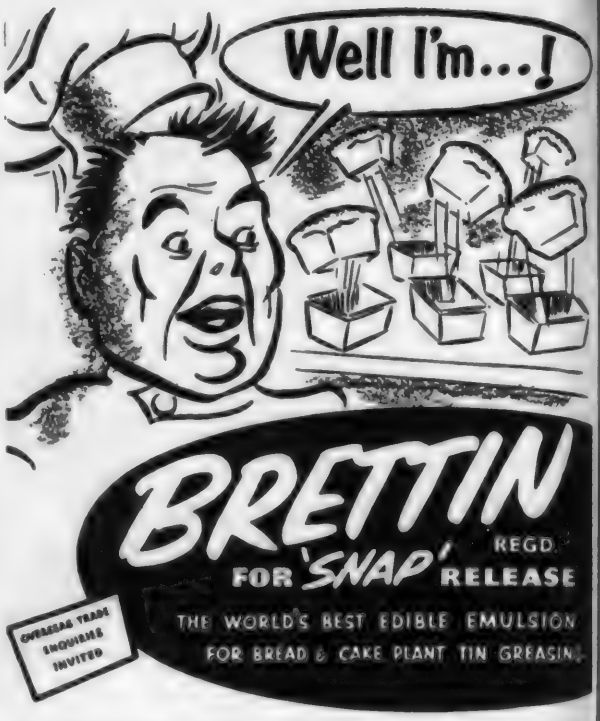

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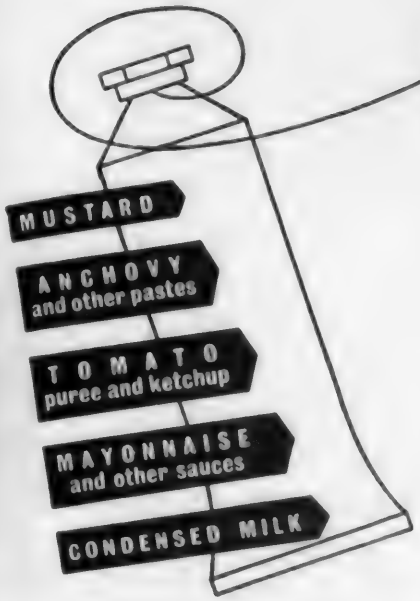

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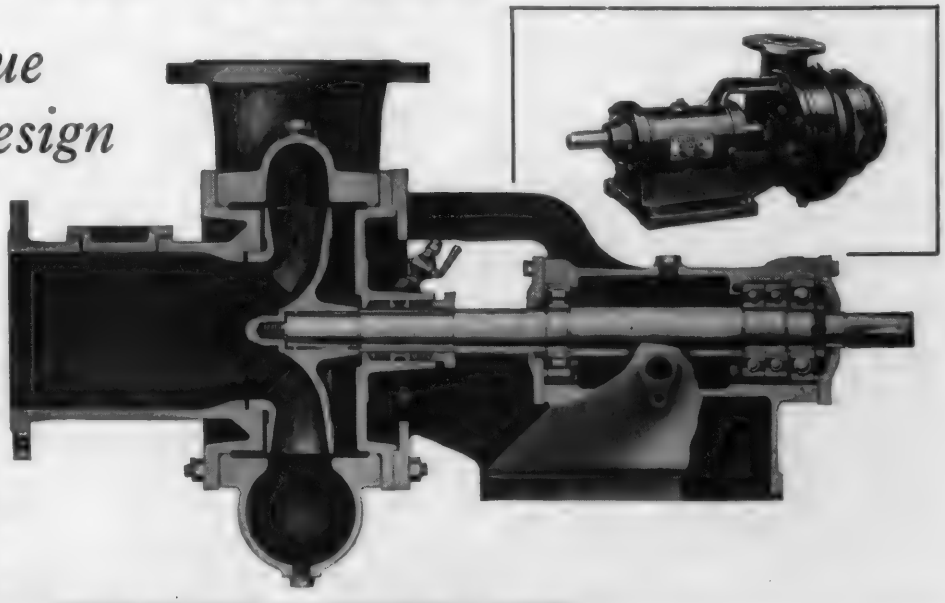

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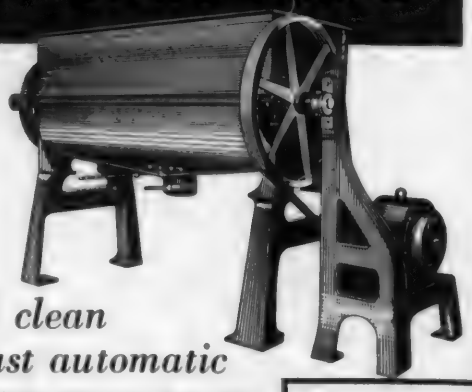

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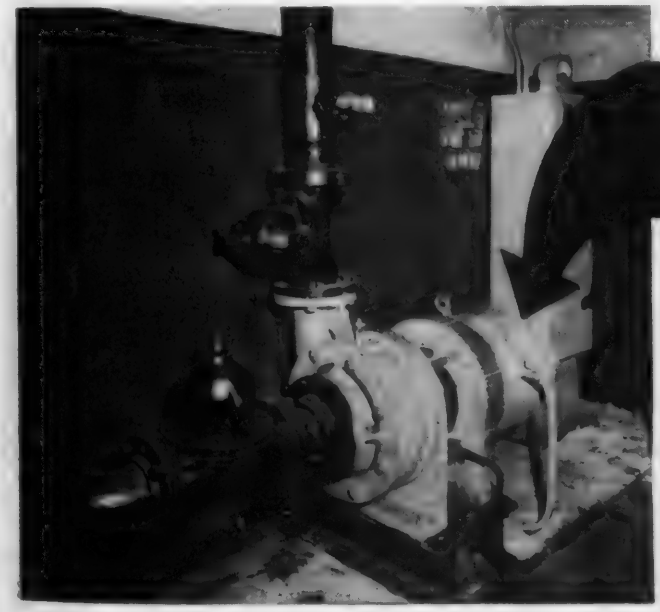

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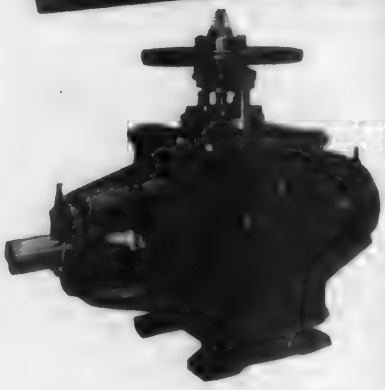

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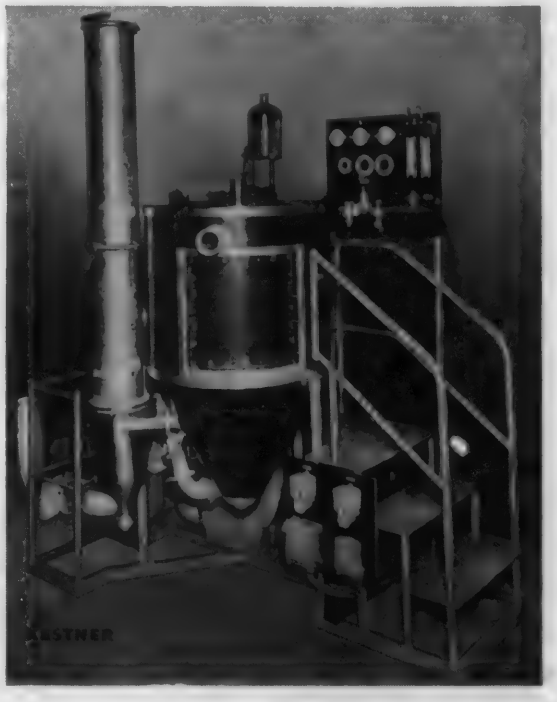

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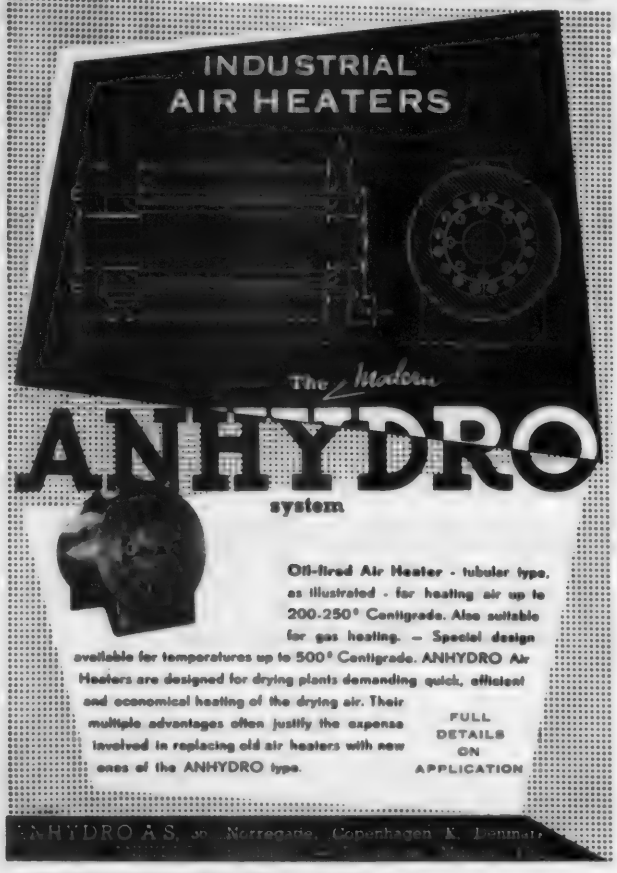

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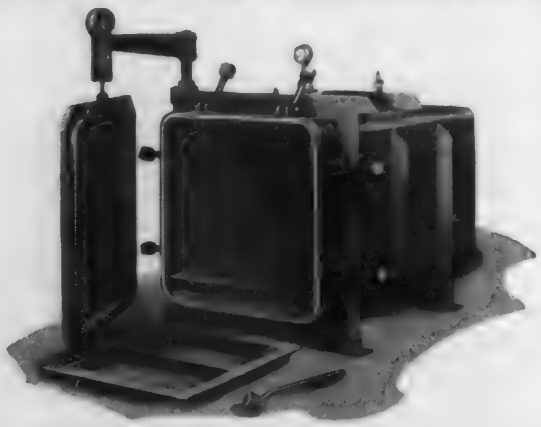

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MATHER and Platt Apple Peeler and Corer, single head. Motorised ½-h.p. motor, 230 v., 3 ph. Output 22 apples p.m. New from makers last year, used for three weeks only.—Box B5180.

REFRIGERATION Compressors: several Sternes 1 M.A.C. and 2 M.A.C. Hall's 6½ by 4 by 4 motors and starters. Weir 5 in. by 5-h.p. motor, Shell and Tube Condenser. Borsic 6 in. by 6in., 25-h.p. motor. Several V.T. 7 Freon 10-h.p. Lightfoot Compressors. D.P. Condensers. Several Q.T.4 Lightfoots. Several 4 in. by 4 in. by Hall Sternes and York. All seen by appointment.—J. Borden, 3, Hallplace, London, W.2. Tel.: PADdington 6619 and 6610.

FOR SALE: one Laboratory Fume Cupboard, G. and T. cat. No. B.10-546, in good condition. Price approximately £15.—Rowat's, Kelvin Avenue, Hillington, Glasgow, S.W.2.

PREMIER Filterpress, model ES/4 Semi-automatic Vacuum Double Seaming Machine for round cans. Stationary type. Complete with motor-driven vacuum pump for 3-phase supply. At present arranged for can 3 in. diam. Maximum capacity up to approx. 6½ in. diam. by 8 in. high. Cans hand fed, with automatic lid feed for use with No. 1 vacuum sleeve. Complete with vacuum sleeve for cans up to approx. 4 in. diam. by 8 in. high. and No. 2 sleeve for cans up to approx. 6½ in, diam. by 8 in. high. Photo.—F. J. Edwards Ltd., 359, Euston Road, London, N.W.1.

VACUUM Can Seamer by Ashworth and Parker for sale. Automatic feed. Capacity 3½" in. diam. by 4½ in. high. Motor driven. Photo, etc.—F. J. Edwards Ltd., 359, Euston Road, London, N.W.1.

PHONE 98 STAINES

Stainless steel jac. cyl. Tipping Mixer, 39 in. by 32 in. deep, w.p. 25 lb., 5 h.p., 400/3/50; ditto, 40 in. by 25 in. deep. Nine welded pressure Tanks, 5 ft. by 5 ft. 6 in. deep. glass-lined Tanks, 2,300 and 600 gall. Bowl Mixers, 10, 30, 40, and 80 quart. Cyl. Mixers up to 1,400 gall. "Z" and Fin blade Mixers up to 30 in. by 27 in. by 20 in. deep. "U" trough Mixers and Sifter/Mixers up to 6 ft. by 2 ft. by 2 ft. (Unused) jac. rec. Tanks, 15 ft. by 4 ft. by 4 ft., 10-lb. w.p. Jac. enamelled cyl. enc. Mixers, 30 in. by 36 in., 400/3/50. Pumps, conches, refiners, edge runners, crushers, ovens, autoclaves, hydros, condensers, conveyors, steam and diesel plant, etc. Lists available.—Harry H. Gardam and Co. Ltd., Staines.

PURDY New-Way Can Labelling Machine, 1953, for Sale. Up to 500 cans per minute up to A2 size. First-class condition. Adjustable up to 4½ inches diameter and 9 inches height. —Offers to Box B5188.

SQUASH Plant for sale, comprising Albro 10 Head Rotary stainless steel vacuum Filling Machine for 26 oz. squash bottles with all stainless steel parts and motor-driven pump. Purdy Rotary fully automatic Bottle Labelling Machine with stainless steel slat conveyor. Inspection London.—Apply Box B5190.

THREE Kellie 100 gall. capacity stainless steel Boiling Pans fabricated from F.M.B. material with bottom outlets and cast iron outer jackets suitable 60 lb. s.w.p. Perfect condition throughout.—Details from Box B5191.

GEM Bottle Washing Machine, 12-wide, 3,000-BPH. Miller Hydro Washer, 1,500-BPH. Clayton "Preheta" Pasteuriser, twin cowl. Sternette Refrigerating Unit with brine tank. Fyna Hammer Mill and Cyclone. "Crispa" Electric Crisping Machines, twin feed. Crypto "Moroil" Electric Oil Extractor, 12 in. lift-out basket. Aluminium D-shape Milk Tank, 400-gall., with agitator. Low prices for quick clearance.—A. H. Kimmins and Sons Ltd., Lyndhurst Road, Worthing.

IRREGULAR Double Seaming Machines by Bon Accord. Stationary type, for sale. At present tooled for 15 ounce oval kipper cans. Automatic track feed. Arranged motor drive for 400/440/3/50. Maximum capacity 8 in. across corners by up to 3 in. high. Similar machines by Olaf Larson also available. Suitable for 16 ounce kipper cans. Capacity up to 7½ in. across corners and up to 4½ in. high. Photographs available, F. J. Edwards Ltd., 359, Euston Road, London, N.W.1.

SECOND-HAND PLANT FOR SALE

MARMALADE and Preserving Plant for Sale. Kellie and Whites Quartering, Peeling and Separating Machines, belt and motor drive. B.C.H. "Turnbull" Peel Chipping Machine with stainless steel working parts and automatic belt feed. B.C.H. "Speedy" Drained Peel Cutting Machine with stainless steel working parts. B.C.H. 15-in. and 8 in. diam. stainless steel Pulping Machines. B.C.H. 40-gall. copper tilting steam jacketed Boiling Pans. Duckworth automatic Jam Filling Machine. Swallow 25-in. diam. latest type motorised Bowl Chopping Machine. Alite Mincemeat Filling Machine. B.C.H. stainless steel and copper Jam Bogeys. Purdy automatic and semi-automatic Bottle Labelling Machines.—C. Skerman and Sons Ltd., 118, Putney Bridge Road, London, S.W.15. Tel.: Vandyke 2406.

PLANT FOR SALE

CENTRIFUGAL Flour Dressing Machines and Reel Sifters. Southall and Smith Automatic Flour Weigher, nearly new, for 1, 2 and 3 lb. Also one for 3, 6 and 12 lb. Two Gardner Combined Sifting and Mixing Machines, size H, 5-cwt. capacity. Reconditioned equal to new Southall and Smith Tea Weighers, ¼ and ½ lb. Drum Type Tea Blender. Reciprocating Sieves.—Frank Stacey and Co. Ltd., Vauxhall Street, Birmingham, 4.

MIXER, stainless steel, for lozenge paste, etc., 2-cwt. cap. Makers B.C.H. In absolutely new condition. Little used. Also 3-cwt. Power Hoist, never erected.—Box B5177.

PHILLIPS X-ray Machine, cost over £1,000. No reasonable offer refused.—Box B5183.

MALANGER Baker Perkins, 5-ft. diam. No reasonable offer refused.—Box B5184.

FOR SALE: Refractometer, desk type, Bellingham and Stanley. Reasonable price.—T. E. Gallagher and Sons, Earl Street, Belle Green Lane, Higher Ince, Wigan.

"CREAM-MASTER" Whipping Machines. For extra yield, stability and flavour. Let us send you details.—Sorensen's, 42, Raby Street, Manchester, 16.

250 and 500 gall.. stainless steel Tanks, with agitators, Benhil butter and margarine Packer, pasteurizer, ovens, mixers, kneaders, racks, provers, baking sheets, etc.—Your enquiries welcomed. Sorensen Bakery Equipment Ltd., 42, Raby Street, Moss Side, Manchester, 16. Tel.: Moss Side 2054.

"CHOCO-MASTER" Enrobers and Covering Chocolate. Please ask for full details.—Sorensen's, 42, Raby Street, Manchester, 16.

TWO 1,000-gallon Stainless Steel Vertical Storage Tanks. 18 in. diam. manway with bolt-on cover. 2½ in. flanged inlet and outlet. Suitable internal pressure 10 lbs. p.s.i. Dull polished inside, descaled outside. Available end January, when completed. One 1,000-gallon Vertical Storage Tank (not suitable pressure). 18 in. dia. manway with bolt-on cover. 2½ in. flanged inlet and outlet. Available end January, when completed.—SANT STURGESS INDUSTRIES LIMITED, Park Royal, N.W.10.

SIX Jackstone Junior Mk. 1 Frosters, twelve plates, excellent working condition £450 each. Two Southall and Smith automatic weighing and filling machines suitable for free flowing cereals.—Box B5194.

SIZE 17 Baker Perkins Universal Mixer, stainless steel trough 62 in. by 43 in. by 35 in. deep, stainless steel double Z blades, undersiung motorised screw tilting with A.C. motor drive. —Donald Leaver Ltd., 165 Railway Arches, Stamford Brook Station, London, W.6.

FOR SALE: Peerless Meat Mincing machine, completely motorised, capacity 1 ton per hour. One Mather and Platt Dicing and Slicing machine, completely motorised, complete with starter, etc.—Box B5164.

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SECOND-HAND PLANT WANTED

WANTED: Motor-driven rotary Syrup/Soup Filling Machine to cover sizes: Picnic, A.1, E.1, 1 tall, A.2, E.2, A.2½. To fill 80 cans a minute.—Box B5179.

FIRM starting new factory for processing all type of nuts, interested good second-hand machines for blanching, roasting, frying, packing, filling and weighing both tins and cellophane small packs, also mixing machines, inspection conveyor belts. Also very good quality second-hand cartons required.—Box B5182.

WANTED urgently. 2,500 kW. back pressure Steam Turbo Alternator Set for 220 lb. initially 13 lb. back pressure, generating 3 phase, 50 cycles. Voltage immaterial. Two sets will be considered.—Reply Box B5193.

CONVEYOR Belt required 18 in. belt width 35 ft. long or thereabouts. Peeling Machine 56 lb. Peerless or similar, also Standard Retorts suitable Canning. Full particulars Kendies Foods, Ltd., Plympton, Devon.

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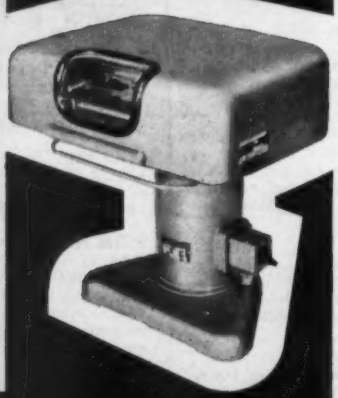

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Printed for the Proprietors, LEONARD HILL LIMITED, and published by them at their Offices, Stratford House, 9 Eden Street, London, N.W.1
by Billing and Sons Ltd., The London Printing Works, Guildford and London, England
Registered for Transmission to Canada including Newfoundland